9-2011

Flagship Species, Tourism, and Support for Rubondo Island National Park, Tanzania

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FLAGSHIP SPECIES, TOURISM, AND

SUPPORT FOR RUBONDO ISLAND NATIONAL PARK, TANZANIA

A Dissertation Presented

by

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Submitted to the Graduate School of the
University of Massachusetts Amherst in partial fulfillment
of the requirements for the degree of

DOCTOR OF PHILOSOPHY

September 2011

Wildlife and Fisheries Conservation

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DEDICATION

To my parents, for always being there

ACKNOWLEDGMENTS

I am grateful to my advisors, John Organ and Tom Serfass, and committee members, Jan Dizard, Todd Fuller, and Robert Ryan, for their invaluable advice, encouragement, and guidance. I thank TANAPA, TAWIRI, and COSTECH for allowing me to conduct this research, as well as the Frankfurt Zoological Society for providing housing on Rubondo Island National Park. This research was made possible by funding graciously provided by Tom Serfass from a University of Maryland Wilson H. Elkins Professorship, and my degree also through an internship with the U.S. Fish and Wildlife Service. For both I am thankful. Funding from the Pittsburgh Zoo and PPG Aquarium was valuable in enabling students participating in surveys to have a meaningful experience. Bridget Amulike was integral to the completion of this project, and her help with field work and translation have been invaluable. Maggie Triska provided much appreciated last-minute help with mapping. I am proud to have had an opportunity to work with the amazing staff of Rubondo Island National Park, who were all so gracious in assisting throughout this project, from driving boats and helping with housing maintenance to collecting surveys, introducing me to local village officers, and answering continuous questions. Hobokela Mwamjengwa was a wonderful asset to the project and I am grateful for the hours she spent assisting with arranging and administering surveys, as well as providing background information on Park outreach. I am also thankful for the support of the Chief Park Warden at Rubondo, Steria Ndaga, during all phases of this research. I thank Arthur Ogada, the very talented artist who drew the otter, genet, silver cyprinid, sitatunga, hippopotamus, monkey, fish eagle, little egret, Egyptian goose, crocodile, and monitor lizard images used on children’s survey. I am grateful to the local governments in the villages surrounding Rubondo and the Kilimanjaro International Airport for allowing me to ask their citizens and patrons to participate in this research. Perhaps most importantly, I thank the people who were willing to take part in and inform this research, including residents of communities surrounding Rubondo, travelers in and visitors to Tanzania, members of the tourism industry, staff of TANAPA, and many others who shared their opinions about Rubondo Island National Park with me. I hope they will find the results worthy of their time. Finally, I thank my my fiancé, Pete, family, and friends for their endless support and encouragement.

ABSTRACT

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SUPPORT FOR RUBONDO ISLAND NATIONAL PARK, TANZANIA

SEPTEMBER 2011

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Two major goals of managers of Rubondo Island National Park (Rubondo), Tanzania are to increase the number of international visitors to the Park (and thereby increase revenue generated) and to increase support for the Park among residents of nearby communities. I investigated species preferences among children living around Rubondo and the wildlife viewing preferences of international visitors to Tanzania in an attempt to identify flagship species that Park management could use in marketing and outreach campaigns designed to meet their goals. I also assessed local interest in visiting the Park. As local flagships for Rubondo, the Egyptian goose (*Alopochen aegyptiacus*) and silver cyprinid (*Rastrineobola argentea*) appear to have the most potential among the species that I assessed (i.e., fish eagle [*Haliaeetus vocifer*], Egyptian goose, silver cyprinid, little egret [*Egretta garzetta*], sitatunga [*Tragelaphus speki*], genet [*Genetta tigrina*], monitor lizard [*Varanus niloticus*], spotted-necked otter [*Lutra maculicollis*], vervet monkey [*Cercopithecus pygerythrus*], crocodile [*Crocodylus niloticus*], hippopotamus [*Hippopotamus amphibius*], giraffe [*Giraffa camelopardalis*], and elephant [*Loxodanta africana*]). However, based on either range or limited aesthetic/behavioral appeal, I considered neither species useful as an international flagship. Among species on Rubondo included in investigations of potential international flagships for the Island (including the chimpanzee [*Pan troglodytes*], crocodile, elephant, giraffe, hippopotamus, vervet monkey, bushbuck, fish eagle, large-spotted genet, goliath heron [*Ardea goliath*], monitor lizard, sitatunga, and spotted-necked

otter), few were concluded to have potential, either because participating visitors had limited "awareness" of and "interest" in viewing the species, local people had strong negative opinions of the species, the animals are not native to the Island, and/or the animals are more easily viewed in more readily-accessible locations. Local people generally had not visited Rubondo but wanted to visit. Not having visited the Park appeared to influence perceptions of the Park, wildlife tourism, and conservation among some participants. Recommendations for local and international marketing and outreach strategies for Rubondo are made based on the outcomes of the aforementioned investigations of local and international species preferences and interest in visiting the Park.

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CHAPTER 1

INTRODUCTION

National Parks

Places considered special by communities around the world have been protected for over a millennium (Eagles et al. 2002). National parks are 1 of 6 types of protected area defined by the IUCN as especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources (Eagles et al. 2002). The first national park (Yellowstone) was developed in the United States in 1872 (Jacoby 2001, Boyd and Butler 2002, Eagles et al. 2002), largely as a result of the work of citizens living thousands of miles away on the East coast and with limited local support (Jacoby 2001, Terborgh and Van Shaik 2002). The governments of Australia, Canada, New Zealand, and South Africa later followed suit to create their own national parks (Eagles et al. 2002). Most Parks encompassed large, natural areas, were open to all people, and were developed with an expectation of tourism (Eagles et al. 2002). Both of the first Park agencies (in the United States and Canada) advocated getting people into the parks to enjoy and financially support them (Butler and Boyd 2002, Eagles et al. 2002). In the United States, the National Park Organic Act of 1916, which established the United States National Park Service, defined the purpose of the parks as being "to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (Eagles et al. 2002:7-8). Today, every continent except Antarctica contains national parks (Dixon and Sherman 1990, Eagles et al. 2002). Countries have learned from one another about how to establish and administer parks (Eagles et al. 2002), and, as a result, most are similar to the first model developed in the US (Boyd and Butler 2002).

Although National Parks have succeeded in protecting vast amounts of land in many countries, the "fortress" (Brockington 2002) system of conservation embodied by national parks has received criticism (e.g., see Sarker and Montoya 2011), particularly in relation to use in the developing world, and is currently at the center of recent discussions regarding the ethics of conservation (commonly referred to as “parks vs. people”) (Miller et al. 2011). Undeniably, the creation of national parks has often resulted in hardships for local people. Communities in areas slated for national parks were commonly evicted, hunting and gathering activities critical to parks’ neighbors regularly curtailed, and, even near long-established Parks in some areas, crops continue to be raided and livestock killed by resident animal populations (Jacoby 2001, Dowie 2009, Duffy 2010, Harter and Goldman 2011, Miller et al. 2011). However, national parks also have strong advocates (e.g., Terborgh and Van Shaik 2002), are widely publicly supported in many countries (Terborgh and Van Shaik 2002), and have proven positive effects on populations of some wildlife species (e.g., Stoner et al. 2009). In addition, parks can provide a variety of ecosystem services (e.g., protection of watersheds that supply public drinking water) and the tourism they generate can result in economic benefits (although these are not always realized locally—Walpole and Thouless 2005) (Nepal 2002).

Protected Areas in Tanzania

In Tanzania, 260,808.29 km^2 of land, or 27.5% of the terrestrial area, is in protected status (IUCN and UNEP-WCMC 2011). Terrestrial protected areas in the country encompass 6 different forms, including game reserves (of which there are 31), forest reserves (463), nature reserves (2), game-controlled areas (41), wildlife management areas (16), and national parks (16) (Caro et al. 2009). As described by Caro et al. (2009), game reserves are managed by the Wildlife Division of the Ministry of Tourism and Natural Resources (MTNR) for sport hunting by tourists and are irregularly patrolled by game scouts. Forest reserves are managed by the MTNR’s Forestry and Beekeeping Division for extraction forestry and receive “only sporadic law enforcement at best” (Caro et al. 2009:179). The Forestry and Beekeeping Division also manages Tanzania’s 2 nature reserves (originally forest reserves, but converted to protect biodiversity). Like the forest reserves they were derived from, the nature reserves receive only sporadic law enforcement. Game-controlled areas are managed by MNRT's Wildlife Division for resident hunting (although now most also are used for tourist hunting). They are patrolled by game scouts only during the hunting season and only when those scouts are accompanying tourist hunters. Wildlife management areas are designed to serve as buffers for other protected areas and as a way for local communities to engage in and benefit from conservation. They are managed by local institutions and patrolled irregularly by village game scouts. The parastatal Tanzania National Parks Authority (TANAPA) manages national parks largely for photographic tourism. No resource extraction is permitted, and the parks are patrolled regularly by rangers (Caro et al. 2009). Not included among these categories is the Ngorongoro Conservation Area (NCA), which is similar to a national park in management and purpose but allows cattle grazing by pastoralists (Stoner et al. 2007).

Rubondo Island National Park

History

Rubondo Island National Park, consisting of 456.8 km^2 of land and water in the southwest corner of Lake Victoria (Figure 1.1), was a forest reserve in German colonial times (TANAPA 2003). In 1965, the Island was declared a game reserve for the purpose of creating a sanctuary where species threatened with extinction could be introduced and protected (TANAPA 2003). The Island was deemed appealing as a game sanctuary based on its wide variety of habitats and absence of large predators. In addition, protecting an island in comparison to other areas was considered relatively easy and Rubondo was thought to have a large number of unoccupied ecological niches (TANAPA 2003). The Frankfurt Zoological Society (FZS) supported Rubondo as a game reserve (and still does today—as a national park), and played a prominent role in the introduction of species to the Island (TANAPA 2003). Species introduced when the Island was a game reserve were: chimpanzees (*Pan troglodytes*), giraffes (*Giraffa camelopardalis*), "black-and-white colobus" monkeys (*Colobus geureza*), suni and roan antelope

(*Nesotragus moschatus* and *Hippotragus equinus*, respectively), African elephants (*Loxodanta africana),* and black rhinoceros (*Diceros bicornis*) (TANAPA 2003).

In 1977 Rubondo Island was declared a National Park (TANAPA 2003). Although the purpose of neither Rubondo nor Tanzania's National Parks in general were originally stated in establishment documents (TANAPA 2003), TANAPA, with input from park managers, planners, community conservation experts, scientists, and tour operators, has identified many "purposes" for the Park. Those are, as listed in TANAPA (2003):

- *To protect and preserve the primary forest, which is unique and one of the last remaining representatives of lowland Congolese forest.*
- *To protect and preserve unique and important fish-breeding grounds that serve the local community fishing industry.*
- *To protect and preserve unique and important bird-breeding grounds.*
- *To protect Rubondo Island National Park as a refuge for endangered species of Tanzania.*
- *To protect and preserve the population of sitatunga* (Tragelaphus spekeii), *endemic to Rubondo Island National Park in Tanzania.*
- *To protect and preserve the high density of fish eagles* (Haliaeetus vocifer).
- *To influence protection and preservation of Maisome Forest Reserve and the channel [in Lake Victoria] that connects it to Rubondo Island National Park.*
- *To protect and preserve the only island national park in the fresh waters of Lake Victoria.*
- *To protect and preserve a unique habitat mosaic.*
- *To protect and preserve an area of high biodiversity value.*
- *To preserve and develop the park as a tourist destination in the Tanzanian section of Lake Victoria.*

- *To preserve cultural sites; i.e., the Solo sites and "Maji Matakatifu."*
- *To protect the integrity of the migratory route for birds from Europe to southern and central Africa.*
- *To protect and preserve an area for the study and monitoring of the introduction and exotic animal species.*

TANAPA has also identified a series of characteristics that are thought to give the Park significance (i.e., identify the importance of the Park for natural and cultural heritage). These are, as identified in TANAPA (2003):

Rubondo:

- *Is the only national park in a fresh water lake in Africa.*
- *Possesses the deepest point in Lake Victoria at Irumo.*
- *Is the only national park with the highest number of mammal and bird species successfully introduced for conservation purposes in Africa.*
- *Is the only national park with an endemic and viable population of sitatunga and with the highest sitatunga population density in East Africa.*
- *Is the only national park in the world in which captive chimpanzees have been successfully introduced into a natural and protected area.*
- *Is the largest protected breeding ground for fish in Lake Victoria; the majority of fish caught by the surrounding communities are bred in Rubondo.*
- *Contains the highest density of fish eagles in Africa.*
- *Has one of the highest diversities and concentrations of birds in Tanzania.*
- *Offers unique Nile perch sport-fishing opportunities in Tanzania.*
- *Boasts a number of sport-fishing world records for Nile perch.*
- *Is one of the most threatened protected areas due to over-fishing and population encroachment in Tanzania.*

- *Is the only national park in East Africa threatened by the impacts of water hyacinth* (Eichhornia crassipes).
- *Contains one of the most unique protected wetlands in East Africa.*
- *Is the only national park and protected area in Lake Victoria.*
- *Is the only national park in Tanzania with grey parrots* (Psittacus e. erithacus).

In addition,

- *Rubondo's shoreline is highly susceptible to pollution.*
- *Rubondo and Serengeti National Park are the only places in Tanzania where lowland Congolese tropical primary forest is represented.*
- *The remoteness of the Park ensures visitors will prefer low-impact activities.*

Although some of the items listed above may be debatable, and certainly many are not among the usual features considered important to natural heritage, they do provide some understanding of the aspects of the Park considered unique by managers, scientists, planners, community conservation experts, and tour operators familiar with it.

Habitat and Wildlife

The main vegetation types on Rubondo Island include papyrus (*Cyperus papyrus* L.) swamp, loudetia grassland (dominated by *Loudetia simplex*), acacia valley open woodland, forest grassland mixture (once heavily cultivated in many areas), and 3 types of forest thicket communities (TANAPA 2003). Eighty percent of the Island is forested (TANAPA 2003). Waters surrounding the Island are also protected and considered important breeding ground for fish (TANAPA 2003, TANAPA 2008*a*). The climate of Rubondo is mild, with temperatures ranging from 16° to 26°C. The rainy season is from October to May, with peaks in December and April/May. From June to September there is little to no precipitation. The average annual rainfall is approximately 120 cm (TANAPA 2003).

Native animal species noted as present on the Island in the Park's General Management Plan (TANAPA 2003) include the sitatunga, bushbuck (*Tragelaphus scriptus*), vervet monkey (*Cercopithecus pygerythrus*), hippopotamus (*Hippopotamus amphibius*), crocodile (*Crocodylus niloticus*), large-spotted genet (*Genetta tigrina*, although Park staff have suggested that the species may actually be the common genet, *Genetta genetta*—G.D. Moshi, Rubondo Island National Park, personal communication), spotted-necked otter (*Lutra maculicollis*), marsh mongoose (*Atilax paludinosus*), cane rat (*Thryonomyidae* spp.), monitor lizard (*Varanus niloticus*), python (*Python* spp.), and about 200 bird species. Other species that have been seen on the Island include clawless otter (*Aonyx capensis*—Kruuk 2006, J. Reed-smith, George Mason University, personal communication), forest cobra (*Naja melanoleuca)*, water cobra (presumably *Boulengerina annulata* although no official reports exist for the species in Lake Victoria—Spawls et al. 2006), and vipers (*Bitis* spp.—G.D. Moshi, Rubondo Island National Park, personal communication). Many of the species introduced during the Island's time as a game reserve are still present (i.e., chimpanzees, giraffes, "black-and-white colobus" monkeys, suni antelope, and elephants), although the introduced roan antelope and black rhinoceros are thought to have been extirpated (TANAPA 2003). More recently (in 2000), 50 confiscated grey parrots were released on Rubondo (TANAPA 2003). A complete biological inventory of the Island has not been completed, but is planned (G.D. Moshi, Rubondo Island National Park, personal communication).

Challenges for Rubondo Island National Park

Like many protected areas, Rubondo faces several challenges. Two of those challenges that have important implications for conservation and the future of the park are low numbers of visitors, resulting in lack of funds, and limited local support, resulting in antagonism toward conservation and possibly a lack of compliance with Park regulations.

Tourism on Rubondo

TANAPA is a parastatal organization funded largely by wildlife tourism, and has recently been under pressure to increase revenue (Bonine et al. 2004). One of the goals of TANAPA's current corporate plan (TANAPA 2008*b*) is to increase income generation to the point of self-sufficiency in operations. Nearly all of TANAPA's revenue is generated by visitor fees (Bonine et al. 2004), with the majority coming from international visitors—both because those visitors constitute the majority (Bonine et al. 2004) and because entrance fees for international visitors are much higher than fees for citizens of countries in the East African Community (TANAPA 2007).

Rubondo has the infrastructure necessary for tourism in place, including several types of accommodation (i.e., a privately-owned luxury tented camp, several Park bandas, and a tent site), some hiking trails, and boats available for sightseeing trips. The Island's location, however, makes it a difficult destination for international tourists to access. Currently, visitors must either charter a plane or make a long journey generally involving a flight, several hours in a vehicle, and a boat ride of up to 2 hours (Figure 1.1). However, in the past, access to the Island was simplified by scheduled flights from Mwanza to the Island. Of the 318,419 visitors to Tanzania that entered the country's 13 National Parks in 2001, only 266 visited Rubondo (Ministry of Natural Resources and Tourism 2007). Rubondo captured a similar percentage of visitors to the Park in subsequent years (Ministry of Natural Resources and Tourism 2007). Increasing tourism to Rubondo is an important goal of TANAPA, and Park management cites the Island's lack of visibility and promotion as a tourist destination as their biggest challenge. Faced with costs that are nearly 8 times its earnings (TANAPA 2003), Park management often finds that funding is insufficient for important activities such as poaching patrols (S. Ndaga, Rubondo Island National Park, personal communication).

Marketing Wildlife Viewing

Marketing materials developed by TANAPA for Rubondo Island National Park (including a calendar, poster, brochure, webpage, and 2-page layout in the booklet "Tanzania

National Parks") have not focused heavily on particular species or consistently marketed the same suite of species. In addition, consistent names are not always applied to the same species (e.g., yellow-spotted otter instead of spotted-necked otter). In all of the most recent versions of the marketing materials mentioned above, sitatunga (Figure 1.2) was the only consistently pictured animal. Species pictured in 2 of the 5 aforementioned marketing materials include fish eagle, reed frog (unknown *Hyperolius* spp.), elephant, crocodile, and little egret (*Egretta garzetta*). Several other wildlife species, including the Egyptian goose (*Alopochen aegyptiacus*), pied kingfisher (*Ceryle rudis*), goliath heron (*Ardea goliath*), and little bittern (*Ixobrychus sturmii*), are pictured in 1 of the marketing materials only. (It is important to note, however, that images of anglers, which imply the presence of sport fish species, are included in all but the poster.) Text does, however, contain mention of a more diverse array of species. For example, the most recent version of the Park's brochure, the item likely most often distributed for marketing purposes, contains mention of the fishery surrounding the Island, as well as hippopotamuses, bushbucks, vervet monkeys, "genet cats" (i.e., genets), sitatungas, crocodiles, and otters. Also mentioned are the introduced chimpanzees, elephants, giraffes, "black and white colobus" monkeys, suni, and grey parrots, as well as the over 200 species of indigenous and migrant birds that live or stop over on the Island. Visitor activities mentioned include sport fishing, bird watching, and chimp trekking (although the Island's chimpanzees are notoriously hard to observe, even for researchers, and no trained guides are employed by the Park). The brochure also notes best times to visit the Park for visitors interested in wildflowers, butterflies, and migratory birds.

TANAPA is not the only entity whose marketing efforts are important to Tanzania's national parks. The Tanzania Tourist Board's role is to promote the country itself as a destination (D. E. Rwehimbuza, TANAPA, personal communication). Owners of lodges within or nearby National Parks also are relied on to market Tanzania's national parks (TANAPA 2008*b*). In fact, in the case of Rubondo, the Island's only privately owned accomodation has a noticeable influence on tourist numbers to the Island. Tour operators also are highly influential in the tourist market in Tanzania (D. E. Rwehimbuza, TANAPA, personal communication). They are expected to promote parks (TANAPA 2008*b*), and have the ability to distribute tourists among the protected areas; however, tour operators are said to want ready-made markets and be reluctant to venture into new destinations (D. E. Rwehimbuza, TANAPA, personal communication). Currently, very few tour operators include Rubondo in their itineraries.

Tourists are an incredibly diverse group in nearly every characteristic, from age to income to preferred activities during travel (Pearce 2005). They represent a wide variety of cultures (Reisinger 2009) and their travel is motivated by many factors (Pearce 2005). Their considerations in choosing a destination also are varied (e.g., see Woodside et al. 2005) and their travel decision-making processes are complicated (Pearce 2005). Different tourists therefore clearly place differing levels of emphasis on each facet (e.g., activities, amenities, etc.) of a destination. However, opportunities to view wildlife, which are known to be important to a large percentage of people generally (see Moscardo et al. 2001 for review), are of primary interest and importance to visitors to Africa (Goodwin and Leader-Williams 2000, Okello 2005, Mladenov et al. 2007). Tourist destinations, unlike basic consumer products, are not just promoted by the tourism industry, but are often “shaped” by marketing efforts (Pearce 2005). Therefore, if those promoting Rubondo Island National Park are including wildlife species of little appeal to tourists in marketing materials, the Park may not only be missing opportunities to attract tourists in the present, but the materials may actually be contributing to the “creation” of an unappealing destination. Also, by not consistently promoting the same species, Park management may be unintentionally minimizing tourists’ perceptions of the abundance and likelihood of seeing species or groups of species. This approach could be particular damaging if certain species are substantially more appealing to visitors than others.

Relationship Between Rubondo and Surrounding Communities

Like the American and South African Parks they were modeled after, permanent human settlement or economic activity was disallowed in Tanania's National Parks (Neumann 1992), a characteristic not generally appreciated by those living within or near Park boundaries (Neumann 1992, Jacoby 2003). Rubondo Island was made a national park, and its former residents subsequently evicted, in fairly recent history (1977). The former residents of Rubondo, many of whom relocated to surrounding communities, were placed in difficult, sometimes fatal, circumstances (Kiwango et al., *in prep*), likely resulting in negative perceptions toward conservation (e.g., see Dowie 2009). Park reports (e.g., TANAPA 2003) suggest that today residents of surrounding communities perceive Park staff and Park management as insensitive to the needs and interests of local people and communities, and also suggest that the members of communities surrounding Rubondo have negative attitudes toward conservation and the proponents of conservation. Although Park staff has cited conflict over fishing in Rubondo's waters as the cause of these perceptions (TANAPA 2003), poaching may be a result of larger underlying issues. Without the support of local people, parks and reserves often are subject to intense poaching, pilfering, and other forms of damage (Jacoby 2003, Kafarowski 2003).

Community Outreach

One of the objectives of Rubondo's management plan involves gaining support for the Park from surrounding communities (TANAPA 2003). Currently, the Park employs 2 full-time outreach staff members, although budgetary constraints (largely due to the cost of boat travel from the Island) limit activities in nearby communities. The Outreach Program of TANAPA seeks to achieve its mission "to improve and maintain good relationships with adjacent communities and key stakeholders in order to protect the integrity of National Parks" through activities such as support for community initiated projects (SCIP), income generating projects, and conservation education (TANAPA 2007). SCIP funding for each Park amounts to 7.5% of its operating budget (TANAPA 2011*a*). Around Rubondo recent SCIP activities have included the building of public schools and community dispensaries. Conservation education activities, when they take place, are focused on imparting general wildlife or environmental knowledge. Recent activities around Rubondo have, for example, included involving students in the development of tree nurseries at public schools (H. Mwamjengwa, Rubondo Island National Park, personal communication). TANAPA's contributions to communities surrounding the national parks are a result of the revenue accrued by tourism (i.e., a form of "benefit sharing") (TANAPA 2008*b*), and therefore are limited in communities surrounding Rubondo because of the low number of international visitors to the Park.

Increasing "Local" and "International" Support: Flagship Species

A variety of approaches (e.g., education, social marketing, and economic incentives) have been used in attempts to gain public support for conservation. One technique for gaining such support is the use of flagship species (flagships), which research has shown can positively influence conservation intentions (Smith and Sutton 2008, Barua et al. 2010). Flagships, defined as "popular, charismatic species that serve as symbols and rallying points to stimulate conservation awareness and action…." (Heywood 1995) [1], can range from lobsters (*Panulirus argus*) (Davis 1994) to lion tamarins (*Leontopithecus* spp.) (Dietz et al. 1994) and have been used around the world (for examples, see Dietz et al. 1994, Leader-Williams and Dublin 2000, and Bowen-Jones and Entwistle 2002). Choosing an appropriate flagship, however, is critical to the method's effectiveness, and the results of choosing an inappropriate species could range from ambivalence to antagonism toward conservation.

[1] By definition flagship species serve a "strategic socio-economic role"—inspiring engagement in, support, and awareness of conservation activities—and should not be confused with umbrella, keystone, or indicator species, all of which serve ecological roles (Leader-Williams and Dublin 2000, Walpole and Leader-Williams 2002). Unfortunately, the term "flagship species" has not always been used in this way (see Leader-Williams and Dublin 2000 for review) and such incorrect usage has led to a subsequent lack of support for the method among some (e.g., Simberloff 1998, Andelman and Fagan 2000).

Many factors should be weighed when choosing which species to use to gain support for a given conservation problem or in a specific area, and the preferences and opinions of all potential audiences should be considered. Flagships often are used to raise support from 2 very different audiences—people living within or near the areas where conservation activities are taking place and potential donors or supporters living far from the area. Choosing an appropriate flagship species requires consideration of the perceptions, preferences, and attitudes of the people whose support is being sought (Dietz et al. 1994, Bowen-Jones and Entwistle 2002). Great care must be taken to ensure that an appropriate species—one that will not engender ambivalence or ill-will among the target audience(s)—is used (Bowen-Jones and Entwistle 2002, Kaltenborn et al. 2006). Although some species may effectively be used to gain support from both audiences, others (e.g., large carnivores) may not serve this dual role (Entwistle 2000, Bowen-Jones and Entwistle 2002). Using potentially dangerous species as flagships, for example, can appear illogical to stakeholders living near the animals and possibly cause antagonism toward conservation (Bowen-Jones and Entwistle 2002). However, species that may be feared in many areas, such as bats (the flying fox, *Pteropus voeltzkowi*), are popular flagship species in other areas (Bowen-Jones and Entwistle 2002). Similarly, species that may not be internationally considered charismatic have led to high levels of positive response to conservation initiatives, as is the case for Bermuda’s endemic skink (*Eumeces longirostris*) (Entwistle 2000).

The Research Project

The primary intention of my research was to help Rubondo’s management team achieve their stated goals (TANAPA 2003) of increasing tourism to the Park (a major source of revenue) and increasing support for the Park among surrounding communities (expected to help limit poaching and other conflicts regarding Park resources) by enabling informed outreach, education, and marketing efforts.

Background

The evolution of the research project this dissertation is based upon took place over the course of time spent in Rubondo Island National Park, surrounding communities, and other areas of Tanzania, and discussions with Rubondo Island National Park staff, TANAPA staff, and members of the tourist industry. I became involved in research on Rubondo because of the Island's spotted-necked otter population, which was studied formally for the first time in the 1980s (Kruuk and Goudswaard 1990). Fourteen years after Kruuk and Goudswaard published their research on Rubondo's otters, members of the IUCN Otter Specialist Group agreed on the need to increase efforts to study African otter species (IUCN OSG 2004). Rubondo's little-studied and highly visible population of spotted-necked otters provided a unique opportunity to learn more about the species, and became the focus of the East African Otter Project headed by Dr. Tom Serfass. In 2007, several years after the project was initiated and following my involvement in grant writing for educational aspects of the project, I first visited Rubondo Island National Park. The limited local support for the Park and low tourism, as well as the prevalence of fish poaching, became obvious over the course of the trip. The use of flagship species as a tool for increasing public support appeared to have potential for helping the Park meet its several of its management goals (increased local and international support).

Given the EAOP's focus, some members of the team were interested in promoting the Island using the spotted-necked otter as a flagship. However, little was known about local perceptions of the otter and interest in viewing the species among tourists. As noted above, the choice of a flagship species is complicated by many considerations. In the case of Rubondo, potential audiences include neighboring communities, tourists, and tour operators (Figure 1.3). Within those audiences preferences and opinions regarding individual species are likely influenced not only by demographic and other variables, but also by the characteristics of the potential flagship species themselves. The purpose of the research this dissertation is based upon was to address the interest in and preferences and opinions regarding a variety of wildlife species among each of those audiences, and, given the particular interest of the EAOP in promoting otters, assess the visibility and habitat use patterns of that species in the case that it was determined to have potential as a flagship species.

Components

I designed my research to investigate the opinions and preferences regarding Rubondo and its wildlife among 3 main audiences: local people, tour operators, and tourists. The study populations and questions addressed, as outlined in Figure 1.3, were based on information derived from previous research related to flagship species, human attitudes toward wildlife, and wildlife tourism.

Local Communities

Through surveys and interviews, local people around Rubondo were asked general questions about wildlife conservation, for their favorite wildlife in general, and then specific questions about the following 13 species: fish eagle (*Haliaeetus vocifer*), Egyptian goose (*Alopochen aegyptiacus*), silver cyprinid (*Rastrineobola argentea*), little egret (*Egretta garzetta*), sitatunga, large-spotted genet, monitor lizard (*Varanus niloticus*), spotted-necked otter, vervet monkey, crocodile, hippopotamus, elephant, and giraffe. Species were chosen for inclusion in the investigation based on a combination of factors, including their uniqueness to Rubondo, appearance, dangerousness, nuisance, competition for resources, and usefulness as a food source. Questions regarding each species were chosen based on published research on influences on wildlife preferences. Surveys administered to both children and adults, included a line drawing of each animal (created by a Kenyan artist), followed by a series of questions about the animal (e.g., Figure 1.4). Interviews conducted with adults included the same types of questions, but also enabled explanation of responses (e.g., see Table 1.1 for animal questions asked during adult interviews). All survey and interview participants were asked several demographic questions including whether any of their ancestors had lived on Rubondo. Participants also were asked about their interest in visiting Rubondo and past visitation, and adults were asked for their opinions about wildlife tourism and national parks.

The first surveys were administered to school children at public schools in 6 communities surrounding Rubondo in May and June, 2008 (Butwa, Ikuza, Izumacheli, Katemwa, Maisome, and Nkome—Figure 1.5) by American and Tanzanian team members and a Park Outreach staff member known by teachers. After preliminary analysis of the data obtained during the first round of surveying, changes were made to the initial survey instrument to address concerns that arose. The revised survey was administered to children in 3 schools during February, 2009 (Butwa—February 17; Katemwa—February 5; Muganza—February 16). During the same time period, other students filled out the old forms, some concurrent with classmates using the new forms.

The revised version of the survey developed for school children (with minor language changes to make it age-appropriate) was administered to adults using the household drop-off method (i.e., a self-administered survey was left at the household and collected later—Stover and Stone 1974, Lovelock et al. 1976) in February, 2009. Two communities, Katemwa and Butwa, were chosen for the adult surveys based on size, geography, and availability of short-term assistants, who administered the surveys.

In part to gain deeper understanding of the topics that I asked about in surveys, in-depth interviews with adult community members also were conducted in several areas. The adult interviews were completed by an EAOP team member (B. Amulike) (who, although Tanzanian, is from a different region) in Katemwa and Nkome in August, 2008, using a combination of snowball and random sampling.

International Visitors

I focused assessments of species' potential to serve as international flagships on wildlife watching appeal because of Tanzania National Parks' heavy reliance on wildlife tourism for revenue generation (Bonine et al. 2004). (Although other types of niche tourism exist—e.g., invertebrate—I focused on vertebrate species, which are generally more popular than invertebrates [e.g., Fredline and Faulkner 2001, Green et al. 2001, Moscardo et al. 2001], and are more commonly of interest to tourists, particularly in Africa [Kerley et al. 2003, Boshoff et al. 2007, Lindsey et al. 2007, Okello and Yerian 2009].) Two surveys were used to assess the wildlife preferences of tourists and their knowledge of and interest in Rubondo. The first was developed for visitors to Rubondo to enable a better understanding of the type of tourist visiting the Island, as well as obtain information on what those visitors view as the Park's highlights and challenges. That survey additionally assessed the wildlife viewing preferences of Park visitors. The second survey targeting travelers (mostly international) in Tanzania also assessed wildlife viewing preferences—this time of potential Park visitors. The survey additionally asked about awareness of Rubondo as a wildlife viewing destination. Because fewer questions were asked about each species in the tourist surveys in comparison to local ones, I was able to include several additional animal species, both found in Rubondo (i.e., bushbuck, goliath heron [*Ardea goliath*], chimpanzee) and not (i.e., African buffalo [*Syncerus caffer*], jackal [black-backed—*Canis mesomelas*], leopard [*Panthera pardus*], lion [*Panthera leo*], mongoose [banded—*Mungos mungo*], black rhinoceros [*Diceros bicornis*], and serval [*Felis serval*]) on those surveys. The little egret, Egyptian goose, and silver cyprinid, were not included because they were considered too widespread or common to have potential as a tourist attraction. Questions asked of visitors regarding specific animals included the participant's familiarity with the animal and the participant's interest in seeing the animal on safari (on a 5-point Likert scale—Likert 1932). Participants were additionally asked to rank their interest in viewing 7 of the species: the chimpanzee, crocodile, elephant, fish eagle, giraffe, sitatunga, and spotted-necked otter.

Between June 2009 and July 2010, visitors to Rubondo completed 165 surveys. I administered 250 other surveys at Kilimanjaro International Airport during December 2009. A graduate of Mweka College of African Wildlife Management was hired to administer surveys from that point until July 2010, but all data obtained during that period were discarded due to concerns regarding reliability.

Tour Operators

Interviews and surveys were conducted with representatives of wildlife tour companies to further assess: their interest and their perceptions of their clients' interest in animal species thought to have potential for marketing wildlife tourism, impediments to visitation to Rubondo, and potential solutions to low visitation of the Island. Arusha is heavily populated with tourism-related industry and is the most common starting place for tourists following the Northern Circuit (the northern-most one of 3 "clusters" of National Parks popularly visited over the course of 1 trip by tourists) where Rubondo could likely be an add-on (i.e., secondary destination). Between January and March, 2009, interviews were conducted with tour company directors (generally) in Mwanza and Arusha (Figure 1.1). All licensed tour operators located in Mwanza were interviewed, as Mwanza is the closest major city to Rubondo, and a typical stopping or changeover location for tourists going to the Island. Often, companies based in other areas cooperate with those in Mwanza when tourists travel to the region. In Arusha, companies were chosen for interviews based on accessibility, availability of appropriate personnel, and size. Generally, the size or client base of an operation was unknown before the interview. However, when such information was available, attempts were made to ensure inclusion in the sample of small, medium, and large companies, as well as those providing budget, mid-range, and high-end tours.

Questionnaires similar to the interview protocol used also were distributed to all Tanzanian tour operators with displays at the Karibu Fair (a travel trade event originally designed to promote Tanzania—but now also including other East African companies and destinations—and serving to connect buyers and suppliers of tourism-related products) in June, 2009.

Otter Viewability

Lastly, data were collected on the behavior and habitat use of Rubondo's population of spotted-necked otters. Although outcomes of flagship species investigations were unknown at the time, due to the interest of the EAOP in promoting the spotted-necked otter and the limited amount of information known about species, the collection of data on the “viewability” of the species that would be necessary were the otter determined to have potential to serve as a flagship species was completed concurrently with other investigations.

Structure of the Dissertation

The chapters of this dissertation focus on the results from the investigations above deemed most critical to primary discussions regarding ways in which support for Rubondo could be increased. Following this introduction, the dissertation contains 4 main research chapters; a summary, recommendations, and conclusions chapter; and one methodological note (as an appendix). Other appendices provide additional information on Lake Victoria and its environs, model results, and the survey instruments used.

- ***Chapter 2*** describes the results of the survey of school children relevant to the students’ perceptions of the attractiveness, usefulness, likeability, and desirability of animal species present in Rubondo.
- ***Chapter 3*** explores how demographic variables may affect some of the perceptions and preferences summarized in Chapter 1, namely “dislike” and desire for “few” of each species.
- ***Chapter 4*** explores local interest in visiting Rubondo, the perceived barriers to doing so, and the influence limited local visitation and perceived barriers to visitation may have on support for Rubondo, National Parks, wildlife tourism, and conservation.
- ***Chapter 5*** addresses tourist interest in viewing various wildlife species, and the implications of those wildlife viewing preferences for wildlife tourism generally and Rubondo in particular.

- The ***Summary, Conclusions, and Recommendations*** chapter (6) summarizes the results reported in Chapters 2 through 5, and discusses their collective implications for the future of Rubondo.
- ***Appendix C*** illuminates one of the methodological challenges faced in this research—the ambiguity created by local and colloquial names for wildlife species.

Table 1.1. Questions regarding individual animals that were included in the interview protocol used to assess local adults' perceptions regarding wildlife, conservation, tourism, and National Parks in the communities surrounding Rubondo Island National Park, Tanzania. *(All animal questions are centered around illustrations of the following species: fish eagle, large-spotted genet, monitor lizard, spotted-necked otter, sitatunga, silver cyprinid, vervet monkey, hippopotamus, crocodile, little egret, and Egyptian goose.)*

Questions asked about 11 wildlife species during adult interviews
1. Which of these animals have you seen or heard about?
2. Which of these animals live near your village or sometimes come to your village?
3. Which of these animals do you think are attractive?
4. Which of these animals do you think are useful?
5. Which of these animals do you like? *For animal liked*: What about this animal do you like?
6. Which of these animals do you not like? *For each animal disliked*: What about this animal do you not like?
7. If you had to pick one of these animals that you like the most, which would it be? Why?
8. If you had to pick one of these animals that you like the least, which would it be? Why?
9. Which of these animals would you like there to be more of?
10. Which of these animals would you like there to be less of?
11. What does each of these animals eat? *(Participants were asked to match the animal illustrations up with the following food cards, as appropriate: wild plants, plants that people grow, wild animals, animals that belong to people, fish, other, and not sure.)*

Figure 1.1. The location of Rubondo Island National Park, Tanzania, and nearby travel hubs. Charter flights to Rubondo are available from Mwanza for a cost of $1,600 USD round trip for a 5-seat plane. Driving time from Mwanza to the Park's ranger station at Nkome is advertised by the Park as 4-5 hours. Reaching the Island from Nkome by boat takes up to 2 hours and costs $100 USD each way. Alternatively, visitors can drive past Nkome to Muganza (advertised driving time: 8-9 hours), from where a boat trip to the Island takes less than 30 minutes and costs $50 USD each way. All driving trips require a ferry crossing.

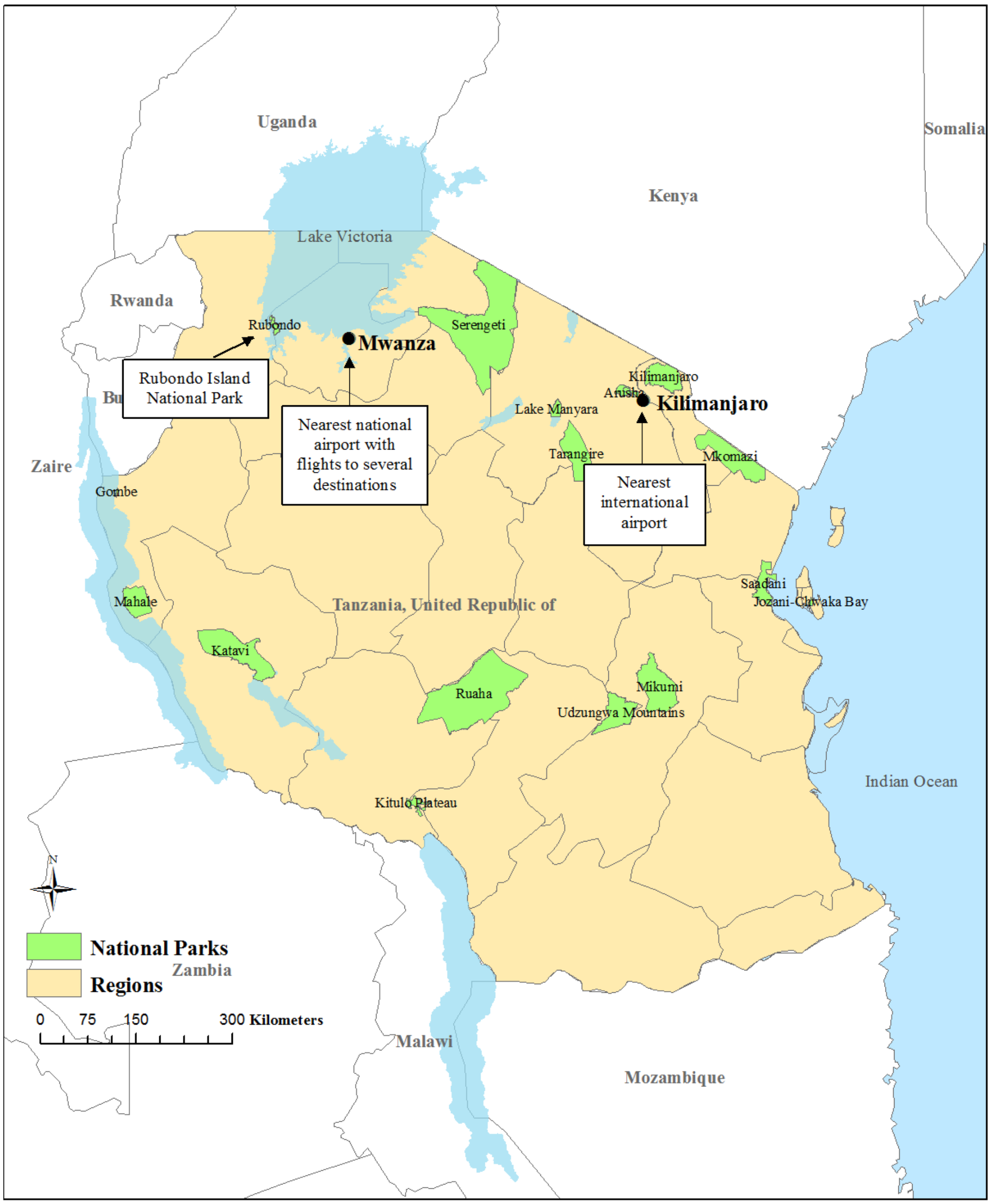

Figure 1.2. The sitatunga is the only animal consistently pictured in recent marketing materials for Rubondo Island National Park.

Figure 1.3. Schematic of components involved in my assessment of potential flagship species for Rubondo Island National Park, as well as the influencing factors that I considered for each.

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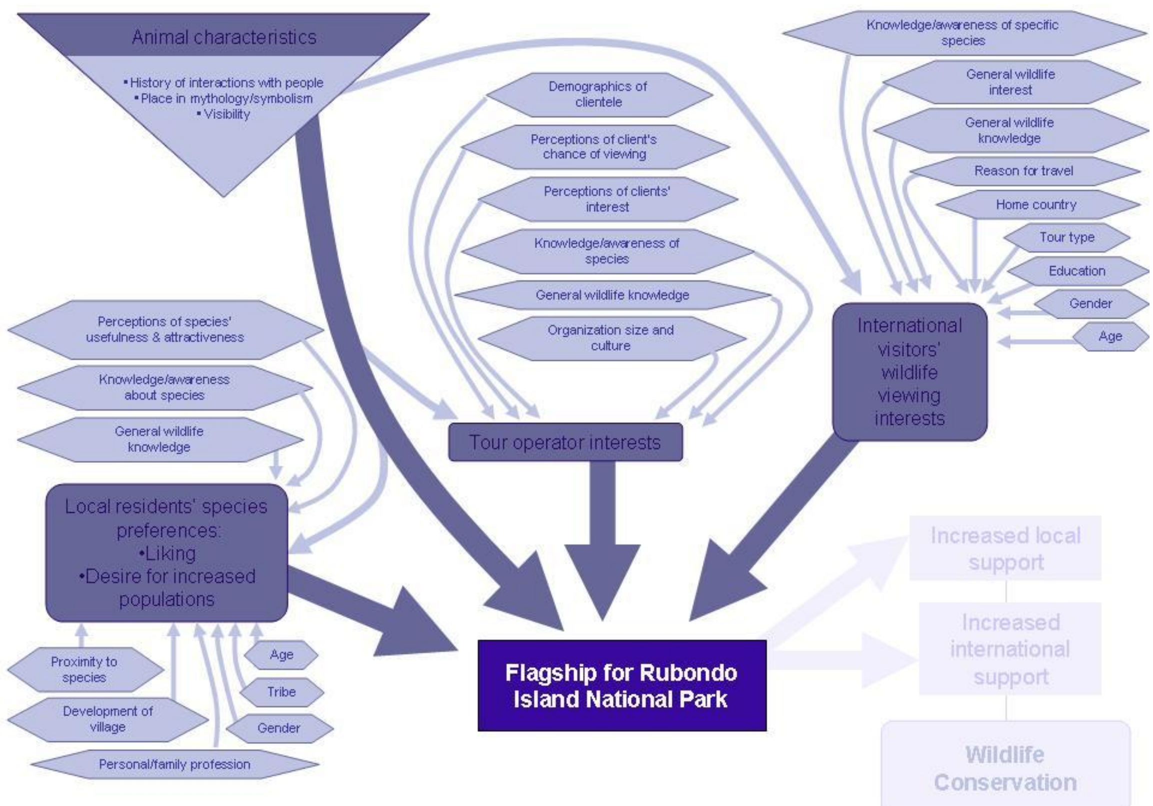

Figure 1.4. Example of the questions regarding each animal that were included in the survey I administered to children and adults in communities surrounding Rubondo Island National Park, Tanzania, in 2008 and 2009

In the table below, please put an X next to the best answer to each of the questions about the animals in the pictures. Please also write the name of each animal on the line below its picture. The pineapple drawing has been placed near the animal to show the size of that animal.

	Does this animal live near your village or visit your village?	What does this animal eat? (Mark the food the animal eats. The animal could eat more than 1 type of food.)	Do you think this animal is attractive?	Do you think this animal is useful?	Do you like this animal?	Do you like these animals to be many where you live?
 Name of the animal_______________	☐ Yes ☐ No ☐ Not sure	☐ Wild plants ☐ Plants that people grow ☐ Wild animals ☐ Livestock ☐ Non-domesticated fishes ☐ Fish caught and stocked by people ☐ Other ☐ Not sure	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion

Figure 1.5. Communities surrounding Rubondo Island National Park where I conducted surveys and interviews to assess local opinions and preferences regarding wildlife, conservation, tourism, and National Parks.

CHAPTER 2

OPINIONS AND PREFERENCES REGARDING WILDLIFE AMONG CHILDREN IN COMMUNITIES SURROUNDING RUBONDO ISLAND NATIONAL PARK, TANZANIA: INFORMING OUTREACH

Abstract

Flagship species can positively influence conservation intentions and have been used around the world to increase support for conservation efforts. However, understanding the target audience is critical before using any species as a flagship intended to raise support for conservation. I surveyed 932 children in public primary schools in 7 communities surrounding Rubondo Island National Park, Tanzania, regarding the familiarity, attractiveness, usefulness, likeability, and desirability of 13 wild animals. Species included in the survey were: fish eagle (*Haliaeetus vocifer*), Egyptian goose (*Alopochen aegyptiacus*), silver cyprinid (*Rastrineobola argentea*), little egret (*Egretta garzetta*), sitatunga (*Tragelaphus speki*), genet (*Genetta tigrina)*, monitor lizard (*Varanus niloticus*), spotted-necked otter (*Lutra maculicollis*), vervet monkey (*Cercopithecus pygerythrus*), crocodile (*Crocodylus niloticus*), hippopotamus (*Hippopotamus amphibius*), giraffe (*Giraffa camelopardalis*), and elephant (*Loxodanta africana*). More than 50% of the students were able to correctly identify illustrations of all but 5 of the species (the spotted-necked otter, sitatunga, genet, Egyptian goose, and fish eagle). Animals that a high percentage of students wanted to be locally abundant were also generally considered attractive and useful, and were well-liked. However, participants did always want to live near species that were generally well-liked and considered attractive and useful. The only species that received high scores on all measures (familiarity, attractiveness, usefulness, liking, and desirability) was the silver cyprinid. Other highly liked and desired species were the Egyptian goose and little egret. This is one of the first assessments of wildlife preferences conducted in Africa that focuses mostly on less well-

known African wildlife species, and the results have implications for the future direction of marketing and community outreach for protected areas.

Introduction

One of the major goals of managers at Rubondo Island National Park (Rubondo) in Lake Victoria, Tanzania, and likely managers of many Parks around the world, is to increase local support for conservation (TANAPA 2003). The use of flagship species—popular, charismatic species that serve as symbols and rallying points to stimulate conservation awareness and action (Heywood 1995)—is 1 avenue management may pursue their goals through. However, although wisely chosen flagship species can positively influence conservation intentions (Smith and Sutton 2008), poorly chosen species may have the opposite effect (Bowen-Jones and Entwistle 2002, Barua et al. 2010). Several researchers have suggested factors that should be considered when choosing a flagship species (e.g., Dietz et al. 1994, Bowen-Jones and Entwistle 2002). The following have been suggested as critical to the choice of a locally-used flagship.

- *Familiarity*: The species should be distinctive, readily associated with locally important habitats, and known to the target audience (Bowen-Jones and Entwistle 2002).
- *Associations*: The species should not already be used to convey conflicting messages or those that may potentially be confused with the conservation message (Bowen-Jones and Entwistle 2002). For example, in the USA a blue jeans- and ranger hat-wearing, shovel-toting character called "Smokey Bear" spreads a public service message about fire prevention in the country's longest-running public service campaign (Ad Council 2008). Ninety-eight percent of Americans shown Smokey's picture can identify him, and 95% can finish his slogan when given the first words ("Remember only YOU…) (U.S. Forest Service 1984). Based on this widespread association of Smokey Bear with fire prevention, using bears as a symbol to spread a different message in the USA may confuse the target audience.

- *Visibility*: To be useful for engendering local support for conservation, the flagship species should be one that local residents can view and, therefore, directly relate to conservation goals (Dietz et al. 1994).
- *Attitudes*: A flagship species should be one with which the focal audience has positive associations (Bowen-Jones and Entwistle 2002), and should have behavioral and physical traits that endear it to the people whose support is sought (Feistner and Mallinson 2000). Kaltenborn et al. (2006) suggest that the best flagship species will be regarded highly and not feared by the target audience.

Unfortunately, whether or not a species fits the above criteria is not always readily apparent, and because each species has its own unique natural history, associated set of positive and negative interactions with humans, and place in local mythology, making assumptions about a species based on generalizations—or research with other species—is unwise.

In Tanzania, few assessments have been conducted regarding local perceptions of the country's less well-known animals, although 2 studies did report that the species most well-liked by Tanzanian adults and children were those that were also aesthetically pleasing, useful (e.g., provided meat or tourism revenue), and/or non-threatening (Entwistle and Stephenson 2000, Kaltenborn et al. 2006*a*). Rubondo has several species of wildlife that are readily seen, distinctive, and occupy important habitats, and are considered useful, non-threatening, and aesthetically pleasing by people in other areas. However, little is known about local perceptions of those species' attractiveness, usefulness, likeability, and desirability. I used group-administered surveys to obtain information on perceptions among local children (the most frequent audience for the Park's outreach activities—H. Mwamjengwa, Rubondo Island National Park, personal communication) of a suite of species occupying Rubondo. Information I obtained will help Park officials to make informed decisions about outreach efforts and may also improve understanding of the relationship between the included species and people in other areas with similar demographics.

Methods

Study Area

This research was conducted in 7 communities near Rubondo that contain public primary schools: Butwa, Ikuza, Izumacheli, Maisome, Muganza, Katemwa, and Nkome (Figure 2.1). The first 4 of those communities are islands, and the remainder on the mainland. Although the villages vary in size and population statistics are not always available, all are rural. On Butwa, in 2007, for example, there were 2,220 residents, 524 of whom were under the age of 14 (M. Chiweki, R. Magessa, and C. Billing; Butwa Island; personal communication). Katemwa had 1,580 residents in 2008 (C. Matonange, Katemwa Village Government, personal communication).

Over 75% of households in Tanzania's rural areas are headed by an individual who works in agriculture or fishing (National Bureau of Statistics 2002). Based on household statistics available from local communities, dependence on fishing and agriculture appears to be prevalent throughout the study area. On Butwa in 2007, for example, the adult working population was divided into farmers (260), registered fishermen (200), small-scale businessmen (31), livestock keepers (47), and traditional healers /"witch doctors" (3) (M. Chiweki, R. Magessa, and C. Billing; Butwa Island; personal communication). In Tanzania, a large percentage of rural households (around 89%) also report owning land for agriculture or grazing (National Bureau of Statistics 2002).

Most rural Tanzanians attend public schools, and only complete the primary standards (i.e., grades) of 1-7 (National Bureau of Statistics 2002, 2007). Less than 3% of adults living in rural Tanzania have completed secondary school (National Bureau of Statistics 2002), and in 2002 secondary school enrollment was comprised of only 5% of 14 to 17-year-olds (National Bureau of Statistics 2002). However, a much larger percentage—56 (rural) to 71% (urban)—of all Tanzanian 7-13 year olds attend primary school (National Bureau of Statistics 2002). Throughout Tanzania, only about 1% of students in primary school attend private institutions (National Bureau of Statistics 2007).

Survey Protocol

My survey instrument included questions about a suite of animal species chosen based on factors such as uniqueness to Rubondo and perceived potential to also serve as a tourist attraction. I selected the following species, representing diversity in attractiveness (based on my own perceptions and the results of previous research), known usefulness, dangerousness, and history of conflicts with humans: fish eagle (*Haliaeetus vocifer*), Egyptian goose (*Alopochen aegyptiacus*), silver cyprinid (*Rastrineobola argentea*), little egret (*Egretta garzetta*), sitatunga (*Tragelaphus speki*), genet (*Genetta tigrina)*, monitor lizard (*Varanus niloticus*), spotted-necked otter (*Lutra maculicollis*), vervet monkey (*Cercopithecus pygerythrus*), crocodile (*Crocodylus niloticus*), and hippopotamus (*Hippopotamus amphibius*). Participants were asked to identify an illustration of each species (as a measure of 1 aspect of the "familiarity" of the species) and then answer a series of questions about the animal including:

- Is this animal attractive?
- Is this animal useful?
- Do you like this animal?
- Would you like this animal to be many where you live?

Two versions of the survey instrument were used (see Appendix B). The second, revised version included 2 additional species (the giraffe [*Giraffa camelopardalis*] and elephant [*Loxodanta africana*]) and the full suite of questions listed above for every species, whereas the first did not ask about attractiveness, usefulness, and desirability of approximately half of the species. Demographic data collected from participants included tribe, standard, school, the profession of the student's head of household (HOH) and, in 2009 surveys only, gender.

School children were chosen as participants in this study because youth often are targeted by environmental education activities (Eagles and Demare 1999, Vaughan et al. 2003) and are the most frequent audience for Rubondo's outreach efforts (H. Mwamjengwa, Rubondo Island National Park, personal communication), surveys can be administered to large numbers of students at one time, and teachers were eager to facilitate youth participation. Public primary school students in particular were targeted because they are more representative of the general population in terms of demographics than students in secondary and private schools. Students in the highest 2 primary standards (6 and 7) were invited to participate in the survey.

The survey instrument was developed in English and translated to Swahili (the language used in Tanzanian public primary schools) by a Tanzanian fluent in both languages. Reviewers, several of whom were native Swahili speakers and Park employees, assessed the English and Swahili versions of the survey for content and face validity. Surveys were administered in classrooms by members of the research team and the Park's outreach staff, with assistance from teachers in some schools. All directions were given in Swahili.

Data Analysis

The children's survey instrument and responses were translated into English prior to data analysis. Quantitative data were analyzed using Stata/IC 11.0 (StataCorp, College Station, Texas 77845, USA). Descriptive statistics were used to assess each measured variable individually. Tribe, the only open-ended variable discussed here, was categorized prior to being quantified.

Participation and Survey Statistics

Participation rates (based on teachers' records of the number of students in each standard) and response rates were calculated. I compared response rates among questions, presupposing that a low response rate for any question in comparison with others in the survey was an indicator of a potential problem with wording, translation, or subject. I also assumed that a pattern of increasing non-response from initial to concluding survey questions was a potential indicator of fatigue among participants. Lastly, in an attempt to identify any potential validity and reliability issues, I combined all non-negative responses (i.e., yes, not sure, and no opinion) and calculated average inter-item correlations for each type of question (e.g., "Do you like this animal?). I determined *a priori* that consistently high correlations (i.e., lack of variation in response to questions of 1 type) would be considered problematic. For example, I assumed consistently high inter-item correlations among liking questions (which would be obtained if individual students consistently chose the same answer regardless of the species in question) were a possible indication that students did not understand the questions, the questions were not formatted in a culturally appropriate manner, or the topic was not salient.

Familiarity

Names provided by participants for each illustration were classified as acceptable or unacceptable (see Appendix C for more detail). In general, the following were accepted (Table 2.1): the Swahili and tribal names specific to the species, names used to refer to a group of similar species the animal is part of (e.g., monkey), and name(s) commonly used for the species locally (although those names are not always formally correct). Some names classified as acceptable under this scheme did not refer only or specifically to the intended species, and this was considered in interpretation of results.

Opinions and Preferences

For opinion and preference questions (i.e., Is this animal attractive? Is this animal useful? Do you like this animal? Would you like this animal to be many where you live?), only the responses of individuals who were able to provide an "acceptable" name for the species were included in the analysis. Therefore, the opinions and preferences of a different sample of respondents are shown for each species, and consequently results are not strictly comparable among them.

Flagship Potential

To facilitate comparisons of flagship potential among the 13 species, I gave each "scores" for familiarity, attractiveness, usefulness, likeability, and desirability, of low (0-50% of participants provided acceptable labels or affirmative responses), medium (51-75%), or high (76-100%). For familiarity only, a score "range" was also calculated by adding the percentage of students who incorrectly labeled the illustration to the original score mentioned above. (The upper range for the familiarity score consequently includes all but those students who provided a blank or invalid response.) I used this method in an attempt to more accurately represent those species that participants commonly mislabeled, as I was concerned that such mislabeling was partially a product of the illustrations used (e.g., the illustrations may not have contained enough distinguishing features) in combination with the similarity of the included species to others present in the area. I determined *a priori* that a score of "low" in any category should be considered a potential impediment to the use of that species as a flagship.

Results

Participation and Survey Statistics

Nine hundred and thirty-two students at 7 public schools in communities surrounding Rubondo participated in surveys. Six hundred and eighty six of those students from 6 schools participated between May 27 and June 3, 2008, and 246 children in 3 schools (1 of which was not included in the previous round of surveys) participated during February, 2009. One hundred and forty-one of the 2009 participants completed the revised version of the survey. The majority of participants were in standards 6 and 7 (Table 2.2), but students in 2 non-target standards (4 and 5) also participated when space in classrooms was available, and their responses were included in analyses. Overall, between 21% and 92% of students in target standards participated in the survey (Figure 2.2). In some schools, due to my travel delays or school schedules only 1 class within standard 6 or 7 was available during the visit. Additionally, space limitations in some schools during visits prevented me from inviting all target classes to participate. Within participating classes, generally all children who were present at school completed surveys. I am aware of only

1 school in which some parents did not allow students to participate (*n* = 8). Surveys generally took about 1 hour to complete, but the length of time required varied among schools.

Farming was by far the most common profession for student HOHs, followed by business (assumed to be nearly all small-scale [e.g., selling vegetables at the open-air market or running a roadside stall], as is common in the area—M. Chiweki, R. Magessa, and C. Billing; Butwa Island; personal communication), fishing and livestock keeping (Figure 2.3). Ten percent of HOHs in farming, 20% in fishing, 15% in business, 47% in livestock keeping, and 41% in other occupations also practiced > 1other profession. Students listed at least 31 different tribal affiliations. Eleven additional names were provided but those could not be confirmed as not being, for example, the product of spelling errors. Ninety-three percent of participants belong to 1 of the 10 most common tribes (Table 2.4). Of the 246 participants asked, 119 were female and 121 were male (6 did not respond).

Response rates were high for demographic variables. Among them, the lowest was for gender (98%). For other variables, response rates were the lowest for questions in which students were asked to name the species (Table 2.3). Also, as expected, many of the students who could not name a species skipped ensuing questions regarding the animal. However, ensuing questions were also skipped in some cases by students who provided a label for a species. For example, every student using the revised survey form in 2009 (*n* = 141) provided a label for the monkey, crocodile, elephant, and giraffe, but 6-12% of those students (depending on the species) skipped subsequent opinion and preference questions about the individual animals.

Throughout all species and all opinion and preference questions, non-response and not sure, no opinion, and invalid answers among students who were able to provide an “acceptable” name for a species ranged from 2% in response to the question about abundance of the Egyptian goose to 28% in regard to usefulness of the genet (Figure 2.4a-d). Responses of unsure and no opinion, as well as missing and invalid responses were greatest on average for questions regarding usefulness of species ($\bar{x}$ = 20% [range: 10% to 28%]). Twelve percent of responses for attractiveness fell into those categories (range: 4% to 18%), as did 9% for liking (range: 5% to 15%) and 11% for abundance (range: 2% to 17%).

Response rates did not appear to decrease as students progressed through the survey. Although such underlying patterns are difficult to assess because non-response for animal questions apparently depended largely on respondents' familiarity with the particular species, response rates for several species on the last page of the survey was 100%. The average inter-item correlations for each of the opinion/preference questions also were low (within attractiveness: 0.18, usefulness: 0.22, liking: 0.11, and abundance: 0.28).

Familiarity

Over 90% of participants provided an "acceptable" label for the elephant (100%), giraffe (95%), crocodile (95%), and vervet monkey (93%) (Figure 2.5). The monitor lizard, silver cyprinid, and hippopotamus were recognized by >75% of participants (82%, 80%, and 79% respectively). Students were least able to name the spotted-necked otter (with only 18% of participants able to "correctly" label the illustration), followed by the sitatunga (21%), genet (31%), Egyptian goose (33%), and fish eagle (44%).

Opinions and Preferences

The species most frequently considered attractive by those able to individually name them were the Egyptian goose (considered attractive by 88% of those able to name it), silver cyprinid (87%), giraffe (84%), and little egret (83%) (Figure 2.6). The elephant, sitatunga, and fish eagle also were generally considered attractive by those able to name them (76%, 74% and 73%, respectively), whereas the crocodile, monitor lizard, and genet were considered attractive by less than half of students able to name them (30%, 41%, and 44%, respectively).

The silver cyprinid and Egyptian goose were the only species considered useful (Figure 2.7) by >75% of the students able to individually name them (86% and 81%, respectively). However, the giraffe, little egret, and sitatunga all were considered useful by ≥66% of the students able to name them (68%, 67%, and 66%, respectively). The species least considered useful were: crocodile (considered useful by 30%), genet (33%), monitor lizard (40%), and vervet monkey (42%).

The Egyptian goose and silver cyprinid were highly liked by participants who were able to name them (91% and 87%, respectively), as was the giraffe (81%—Figure 2.8). The species most disliked by those able to name them were: crocodile (disliked by 77%), genet (48%), monitor lizard (43%), hippopotamus (42%), spotted-necked otter (34%), and vervet monkey (29%).

More than 75% of the respondents who were able to name the silver cyprinid wanted it to be abundant nearby (Figure 2.9). A similar percentage wanted the little egret and Egyptian goose to be abundant nearby. Fewer than 50% wanted many of the crocodile, genet, monitor lizard, vervet monkey, hippopotamus, and spotted-necked otter nearby. For each of those species, ≥40% of the students able to label them specifically did not want the animal to be abundant nearby.

Flagship Potential

Several species received scores of "high" in all or most measured categories (Table 2.5). The best scoring species, the silver cyprinid, scored "high" across all categories. The Egyptian goose received "high" scores in all categories except familiarity. (In that category, the Egyptian goose, like the fish eagle and genet, received a score "range" of low-medium, indicating that students commonly misidentified the species.) The little egret and giraffe obtained scores of "high" in all but 2 measured categories as well, and no scores of "low." Also scoring reasonably well were the fish eagle, sitatunga, and elephant, none of which received scores of "low" in any of the opinion and preference categories. The genet, monitor lizard, spotted-necked otter, vervet monkey, hippopotamus, and crocodile, however, all received "low" for desirability, and all of those species except the hippopotamus also received a "low" in ≥1 other measured category.

Discussion

Familiarity

Participants were generally most familiar with iconic African wildlife species (elephant and giraffe), as well as those that are commonly used for food (silver cyprinid) or pose a threat to lives (crocodile and hippopotamus) or livelihoods (monkey). The last of the well-known species, the monitor lizard, is similar in size and morphology to the more dangerous crocodile, and ability to distinguish between the 2 is likely an important skill for children living within the range of both species. The students' overall unfamiliarity with spotted-necked otter, fish eagle, Egyptian goose, sitatunga, and genet is not particularly surprising, given the species' habitat requirements and activity patterns. The spotted-necked otter, although active during the day, can be elusive. In addition, the animal would only be known to students who spend time near the Lake. The fish eagle and Egyptian goose, although also active during the day, generally remain close to Lake Victoria as well. Similarly, the sitatunga is a wetland species (Games 1983) that is not present in the immediate vicinity of most of the communities included in my study area (G. Moshi, Rubondo Island National Park, personal communication), where shores are heavily human-impacted. The genet, although not restricted to aquatic areas, is nocturnal (Ikeda et al. 1983, Palomares and Delibes 2000). Therefore, although the animal has a pervasive reputation among adults in the area for preying upon chickens (unpublished data), relatively few people may have actually seen a genet.

As is typical in Tanzanian public primary schools, students were heavily crowded into classrooms during survey administration, resulting in opportunities to share answers, which may have inflated the percentage of students able to correctly name each species. However, the sharing of answers may also have served to moderate difficulties caused by students' lack of familiarity with activities of this type. Regardless, the sharing of answers should not have a substantial influence on general comparisons of familiarity among species.

Opinions and Preferences

The results of my research, which show that the silver cyprinid is more commonly considered attractive among children in the study area than the genet, fish eagle, spotted-necked otter, sitatunga, and vervet monkey, suggest that attractiveness of animals, like charisma (Lorimer 2007), is complex and perceived differently among people and cultures—a suggestion also previously made by Roque de Pinho (2009). Such differences in perceptions among people and cultures further highlights the problems that could be caused by choosing a flagship species without adequate research on opinions and preferences of the target audience: a species that is considered "attractive" in one culture may not be considered so in another.

The percentage of students who liked a species was often similar to the percentage considering the species useful and attractive, although this was not always the case. The crocodile, for example, was considered useful by 30% of participants, and also considered attractive by 30% of participants. However, only 16% of participants liked the animal. Conversely, 63% of students liked the vervet monkey, although only 53% considered the monkey useful and only 42% considered it attractive. Roque do Pinho (2009) also reported complex relationships between people's perceptions of a species and their affinity for the species. A number of other factors likely also influence affinity for and desire to live near a species, such as an individual's: background and general wildlife values; interactions with and exposure to animals; level of dependence on local resources, knowledge and understanding of wildlife; perceptions of the animal's intelligence, similarity to humans, dangerousness, and likelihood of inflicting property damage; and the species' cultural and historical relationships with people, all of which affect general preferences for and attitudes toward wildlife (Kellert 1985*a*, Kellert and Berry 1987, Kellert 1994, Bjerke et al. 1998*b*, Czech et al. 2001, Ericsson and Heberlein 2003, Kaltenborn et al. 2003, Tisdell et al. 2006, Røskraft et al. 2007). An individual's wildlife value orientation (Manfredo 2008) likely also influences the relative importance of attractiveness and usefulness in forming opinions and preferences regarding a species. And in rural Tanzania, where over one-third of the population falls below the basic needs poverty line (National Bureau of Statistics 2002), usefulness of an animal may be particularly important in influencing opinions about the species, regardless of wildlife value orientations.

As might be expected, school children in Tanzania have little desire to live near the hippopotamus and crocodile (likely because of the danger posed by both, although the hippopotamus also does raid crops in at least some of my study communities [unpublished data]) or the spotted-necked otter, vervet monkey, or genet (possibly because those species are respectively known to raid fishing nets and crops and prey upon chickens—unpublished data). However, species that are little desired are not always little liked. For example, 40% of the children living around Rubondo would like few vervet monkeys to live nearby, but only 29% dislike the species. These results highlight the importance of asking the "right" questions in investigations of flagship species. For many practical purposes, such as the choice of a potential local flagship for an area designated for species protection (and from where such species may disperse), basing decisions on reported "liking" of a species is probably not appropriate: "Liking" a species does not always translate to wanting to live with a species.

Flagship Potential

Among the species included in my survey, the Egyptian goose and silver cyprinid may have the most potential as local flagships. Both scored "high" for attractiveness, usefulness, likeability, and desirability, but the goose received only a "low-medium" for familiarity, whereas the silver cyprinid also scored "high" in that category. (Although I accepted the very general label "fish" for the silver cyprinid, based on the size of the fish illustrated and the importance of silver cyprinid in the local diet I suspect the majority of students using the label "fish" were familiar with and thinking of the silver cyprinid, and therefore I believe my results accurately portray students' comparative familiarity with each species.) Regardless of the silver cyprinid and Egyptian goose receiving the highest scores, several other species may have potential to serve as even more effective local flagships for Rubondo. For example, given that the species are generally liked and desired by the children familiar with them, the little-known sitatunga and the also poorly-known or distinguished fish eagle may serve as effective flagships for the Park if management is willing to invest in education and outreach. These species may have the advantage of also serving the dual role of an international flagship for Rubondo—a role not suited to a small, plain fish, such as the silver cyprinid, or a widespread waterfowl naturalized on several other continents (Sutherland and Allport 1991, Lensink 1998, Braun 2004), such as the Egyptian goose.

Communication and persuasion techniques can be effective tools for influencing attitudes, and are well-studied in social science disciplines (Petty et al. 1992, Eagly and Chaiken 1993, Bohner and Wänke 2002, Johnson et al. 2005). Within the field of wildlife conservation, Tisdell et al. (2006) reported increases in support for survival of particular species after information was provided. Additionally, a study of the effectiveness of various education strategies showed that information provision in combination with other typical components of wildlife education programs positively influenced children's attitudes toward wildlife (Morgan and Gramann 1989). An excellent example of the ability of education to enable a once little-known animal to serve as an effective flagship—and a potentially useful model to follow—may be found in The Golden Lion Tamarin Conservation Program in Brazil (Dietz et al. 1994, Dietz and Nagagata 1995). However, regardless of the amount of education and outreach undertaken, there may still be few strong cultural or historic attachments to those species—and this should be considered in choosing flagship species.

Conversely, some species that scored reasonably well may not be wise choices for flagship species for Rubondo. The elephant and giraffe, both fairly well-known, largely considered attractive and useful, and reasonably well-liked and desired, are 2 such species. The animals in the Park were introduced in the 1960s and 1970s (TANAPA 2003), and are not present in nearby communities or immediately adjacent areas. Using an introduced species to represent conservation of a National Park may not be an ecologically or socially wise choice, given the potential problems caused by introductions of species into previously unoccupied areas.

Several additional species, although popular in some parts of the world, also have limited potential as local flagships for Rubondo. Crocodiles and hippopotamuses, both fairly popular among tourists (Chapter 5), are little desired by children in the area. Other species that are considered attractive and charismatic by many in the Western world, such as the genet and spotted-necked otter, received lower than expected scores in all measures. In considering choices for flagship species, practitioners should remember that changing strong negative attitudes through communication may not be possible, as increased knowledge is not necessarily congruent with more positive attitudes. People with strong attitudes on a particular topic often use any new knowledge to build arguments to further support their existing attitude (Petty et al. 1992). Therefore, assessing the strength of negative attitudes among those who report disliking and wanting few of any species considered as a flagship would be wise. In addition, further research should be conducted to determine whether those people disliking or not wanting to live near the species share certain characteristics.

In other parts of Africa, species' roles as tourist attractions have apparently led to more positive perceptions of those species among local people benefitting from tourism (e.g., Hemson et al. 2009). However, such associations should not lead managers to conclude that we can always make a species more well-liked by proving its usefulness as a tourist attraction. In addition, prior to casting species with tourism potential in roles as attractions, the risks and potential benefits of doing so should be very carefully considered. Local people benefitting from or supportive of tourism could likely be convinced to adopt more positive attitudes toward a previously little-liked or desired species if that species was shown to be a tourist attraction. That animal could, consequently, become more well-known and well-liked based on this role. However, should tourist numbers decline as a result of a crisis (as happened, for example, in response to the events of September 11 and foot and mouth disease—Goodrich 2002, Luvanga and Shitundu 2003, Eugenio-Martin 2006), a species mainly valued in local communities because of its appeal to international tourists could become a symbolic scapegoat for a frustrated local public.

The most pragmatic next step in flagship selection for Rubondo may be to allow nearby communities to “elect” a local flagship, or even a suite of flagships, for the Park. Rubondo’s management could select and include for voting only those species with most potential—perhaps not only locally, but internationally as well—to highlight the Park’s most important conservation needs. Management could also use the opportunity such a vote would create to educate local communities about the species included. Involving nearby communities in choosing local flagship(s) for Rubondo will not only ensure the species used will engender local support, but also likely help to build goodwill between the Park and those communities.

Table 2.1. Names accepted for each species in my 2008/2009 survey regarding the opinions and preferences about wildlife of school children in communities surrounding Rubondo Island National Park, Tanzania.

English & scientific names for the species	**Swahili/tribal names accepted for the species**	**Species (or types of species) referred to by the accepted names**
Fish eagle (*Haliaeetus vocifer*)	kwazo (kwezi), tai, tai samaki	fish eagle, eagle
Genet (*Genetta tigrina*)	cheche, kicheche, nyalukala, paka pori	genet, genet/mongoose*
Monitor lizard (*Varanus niloticus*)	kenge, mbulu kenge, mjusi	monitor lizard, lizard
Spotted-necked otter (*Lutra maculicollis*)	fisi maji, fina	otter
Sitatunga (*Tragelaphus speki*)	nyesanga, nzobe, nzohe, swala	sitatunga, antelope
Silver cyprinid (*Rastrineobola argentea*)	dagaa, samaki, soga	silver cyprinid, fish
Vervet monkey (*Cercopithecus pygerythrus*)	kima, ngedere, nyani, tumbili	vervet monkey, monkey
Hippopotamus (*Hippopotamus amphibius*)	kiboko, enzubha	hippopotamus
Crocodile (*Crocodylus niloticus*)	mamba	crocodile
Little egret (*Egretta garzetta*)	nyangenyange, yangeyange	little/cattle egret*
Egyptian goose (*Alopochen aegyptiacus)*	lyoyo, bata maji, bata pori	Egyptian goose, waterfowl
Elephant (*Loxodonta africana*)	tembo	elephant
Giraffe (*Giraffa camelopardalis*)	twiga	giraffe

* One term is used to refer to these species collectively.

Table 2.2. The number of students in the communities surrounding Rubondo Island National Park, Tanzania, participating in 2008/2009 survey about opinions and preferences regarding wildlife, by year, school, and standard (grade).

School	2008		2009				*Total*
	Std. 6	***Std. 7***	***Std. 4***	***Std. 5***	***Std. 6***	***Std. 7***	
Ikuza	7	24	-	-	-	-	31
Izumacheli	59	47	-	-	-	-	106
Maisome	57	46	-	-	-	-	103
Nkome	86	123	-	-	-	-	209
Butwa	29	34	3	13	23	3	105
Katemwa	96	78	-	-	133	-	307
Muganza	-	-	-	-	33	38	71
Total	334	352	3	13	189	41	932

Table 2.3 (a and b). Numbers and percentages of students not responding to animal naming questions (a) and not asked questions for which sampling was partial (b) in 2008/2009 survey regarding wildlife preferences of children in communities surrounding Rubondo Island National Park, Tanzania. All percentages reported are based on the total number of participants (n = 932).

a. The number of students that failed to provide a label for each animal illustration.

	Non-response	
Species	**No.**	**%**
Elephant	0	0
Giraffe	0	0
Crocodile	15	1.6
Vervet monkey	23	2.5
Hippopotamus	51	5.5
Monitor lizard	120	12.9
Silver cyprinid	178	19.1
Little egret	227	24.4
Fish eagle	239	25.6
Egyptian goose	269	28.9
Genet	370	39.7
Spotted-necked otter	496	53.2
Sitatunga	497	53.3

b. The number of students not asked questions with partial sampling

Question	**No.**	**%**
Gender	686	73.6
For vervet monkey, hippopotamus, crocodile, little egret, and Egyptian goose:	791	84.9
Is it attractive?		
Is it useful?		
Do you like this animal to be many where you live?		
For elephant and giraffe:	791	84.9
All questions, including naming		

Table 2.4. Tribal affiliations listed by ≥10 participants in my 2008/2009 survey of 932 schoolchildren in communities surrounding Rubondo Island National Park, Tanzania.

Tribe	**Participants**
Hangaza	10
Subi	12
Sweta	16
Luo	17
Kuria	23
Ha	33
Kara	36
Haya	49
Kerewe	78
Jita	136
Zinza	220
Sukuma	241
Total	871

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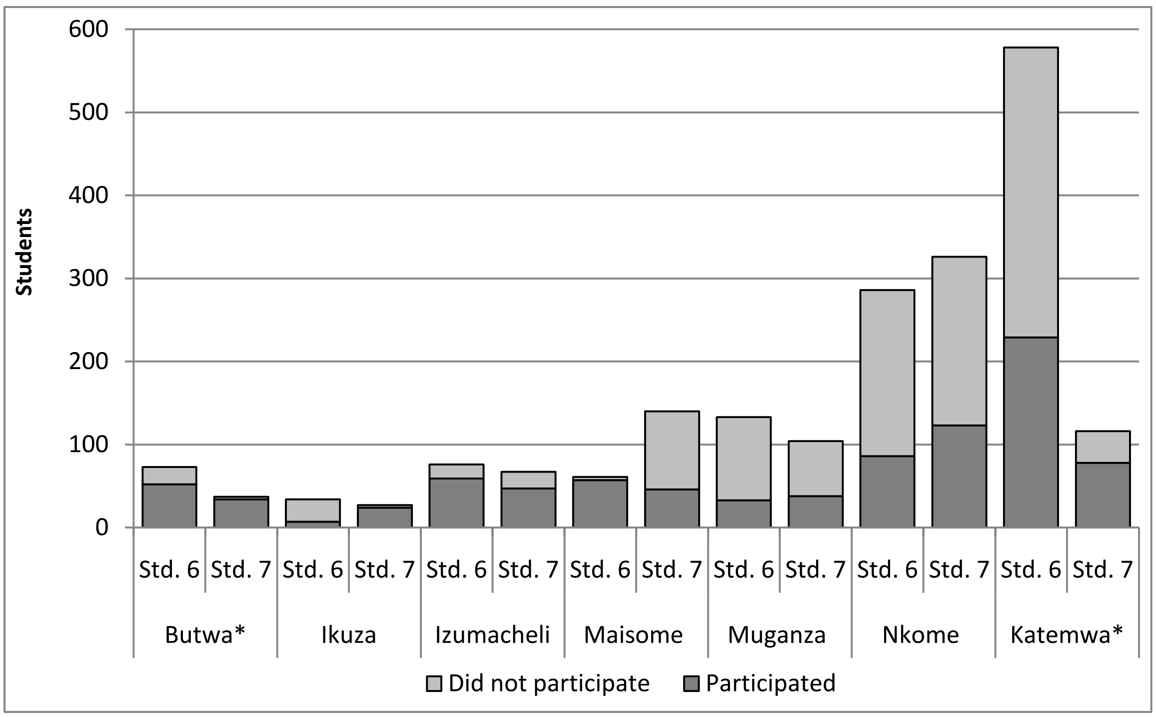
Table 2.5. Familiarity, attractiveness, usefulness, likeability, and desirability scores for each of 13 wildlife species I asked 932 schoolchildren in communities surrounding Rubondo Island National Park, Tanzania, about in my 2008/2009 survey. Attractiveness, usefulness, likeability, and desirability were each given a score of Low (0-50% of students able to name the species answering affirmatively), Medium (50-75%), or High (75-100%). Familiarity was categorized in the same way, but unlike other variables, is reported as a range for some species. The lowest category listed is based solely on the percentage of students able to correctly name the species. If adding the percentage of students who incorrectly labeled the illustration to the percentage of students able to provide an acceptable name the species moves the rating into the next highest category, that category is listed as well.

	Fish Eagle	***Genet***	***Monitor Lizard***	***S-N Otter***	***Sitatunga***	***Silver Cyprinid***	***Vervet Monkey***	***Hippo-potamus***	***Crocodile***	***Little Egret***	***Egyptian Goose***	***Elephant***	***Giraffe***
Familiarity	Low-Med	Low-Med	High	Low	Low	High	High	High	High	Med	Low-Med	High	High
Attractiveness	Med	Low	Low	Med	Med	High	Med	Med	Low	High	High	High	High
Usefulness	Med	Low	Low	Med	Med	High	Low	Med	Low	Med	High	Med	Med
Likeability	High	Low	Low	Med	Med	High	Med	Med	Low	High	High	Med	High
Desirability	Med	Low	Low	Low	Med	High	Low	Low	Low	High	High	Med	Med

Figure 2.1. The communities around Rubondo Island National Park, Tanzania, where surveys of school children were conducted in 2008 and 2009.

Figure 2.2. The number of students enrolled in each target school and standard that did and did not participate in my 2008/2009 survey regarding the wildlife opinions and preferences of children living near Rubondo Island National Park, Tanzania.



*Sampled in both 2008 and 2009, and sums are reported.

Figure 2.3. The number of the 932 participants in my 2008/2009 survey of school children in communities surrounding Rubondo Island National Park, Tanzania, who have parents in various professions.

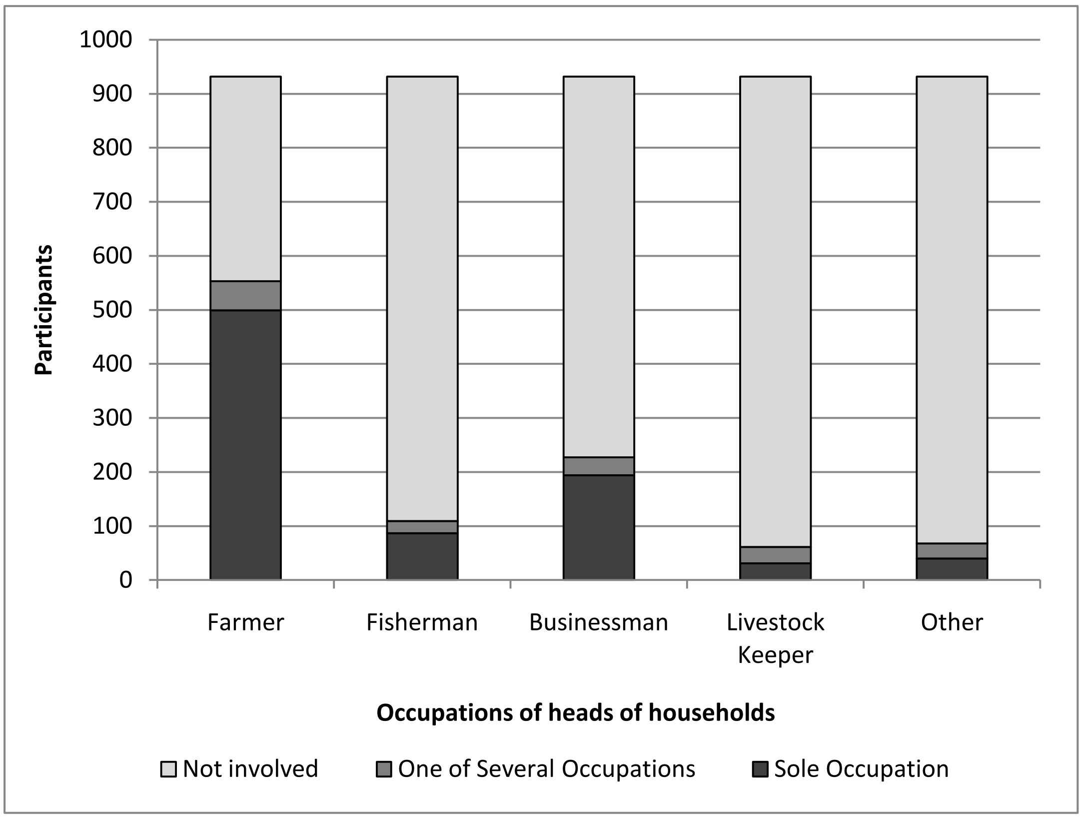


Figure 2.4. For each opinion/preference question in my 2008/2009 survey of school children in communities surrounding Rubondo Island National Park, Tanzania, the percentage of students who were able to name the species that did not respond, did not have an opinion, were not sure of their opinion, or provided an invalid response. Sample size is included inside the appropriate bar for each species and variable.

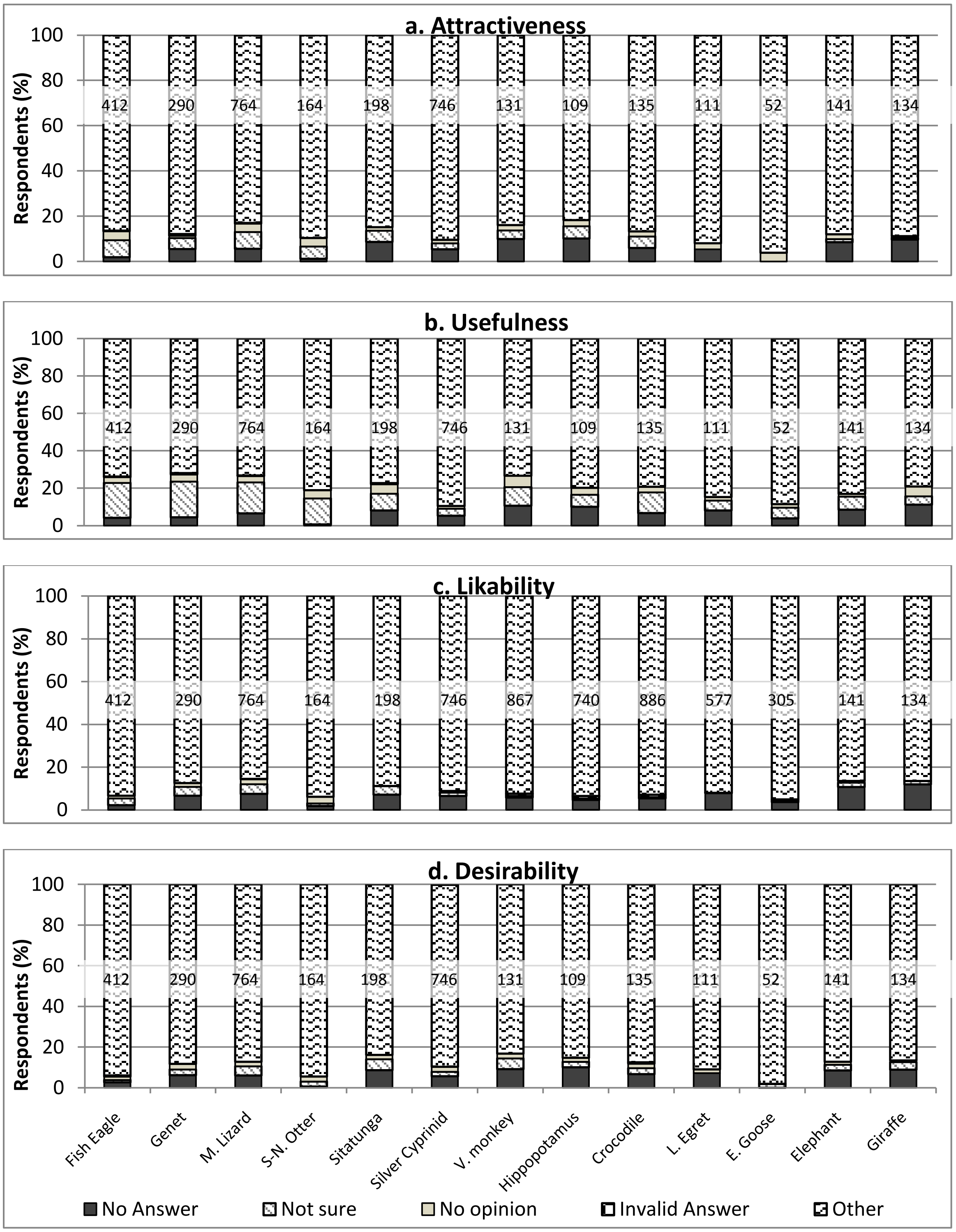


Figure 2.5. The number of participants in my 2008/2009 survey of schoolchildren in communities surrounding Rubondo Island National Park, Tanzania, able to provide an “acceptable” name for each of 13 wildlife species (n = 932).

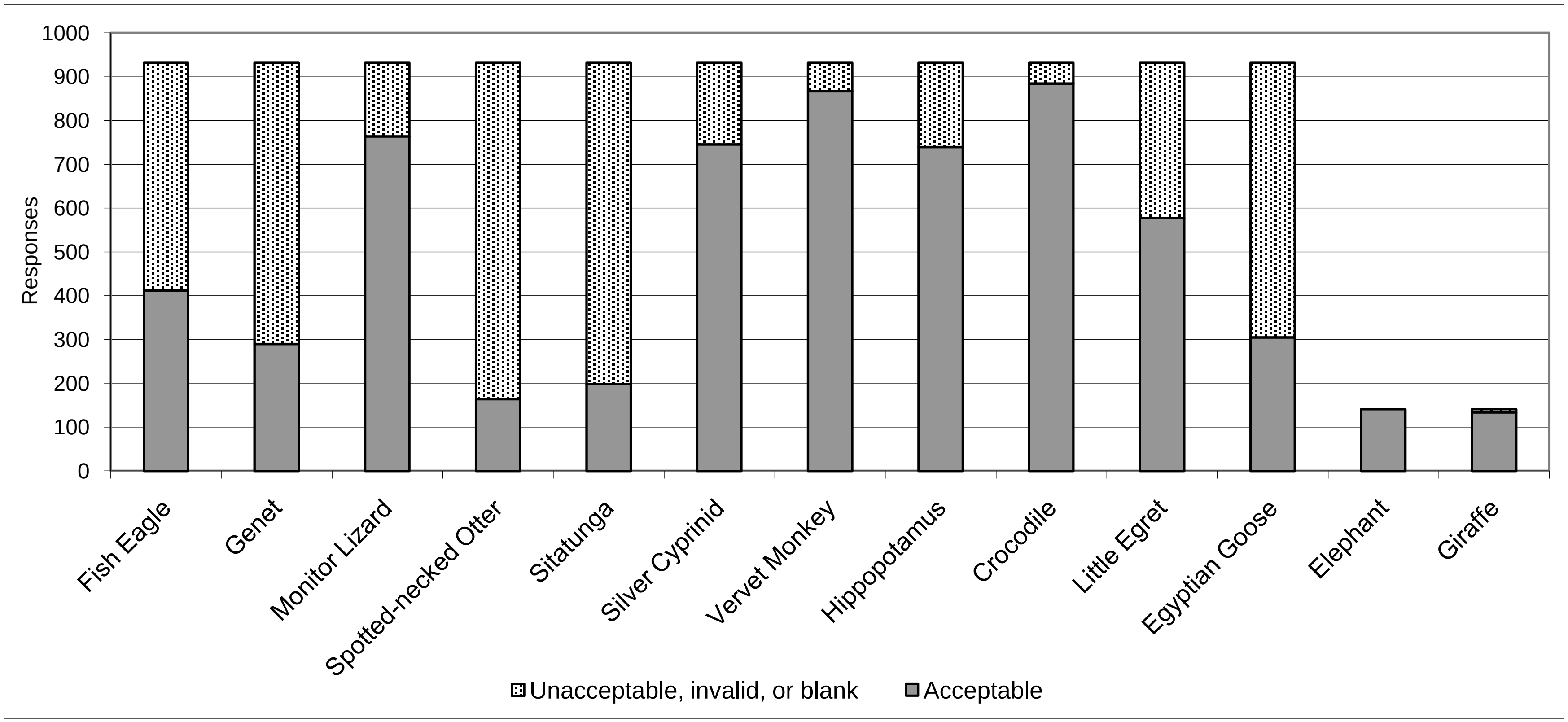


Figure 2.6. The percentage of students participating in my 2008/2009 survey in communities surrounding Rubondo Island National Park, Tanzania, that considered each of 13 species attractive. Only the responses of participants able to name the individual species are shown, and the relevant sample size is indicated at the top of each bar.

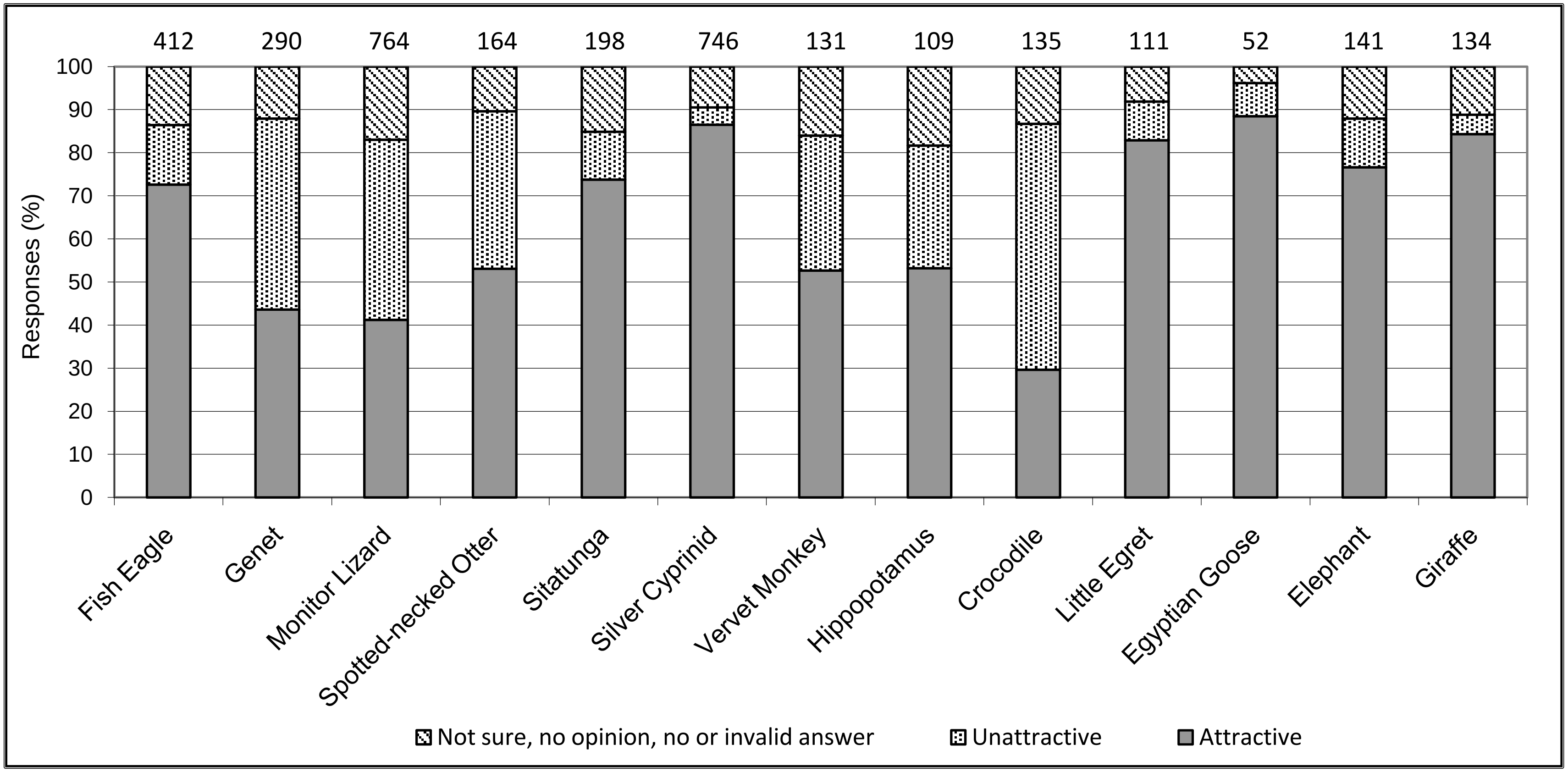


Figure 2.7. The percentage of students participating in my 2008/2009 survey in communities surrounding Rubondo Island National Park, Tanzania, that considered each of 13 wildlife species useful. Only the responses of participants able to name the individual species are shown, and the relevant sample size is indicated at the top of each bar.

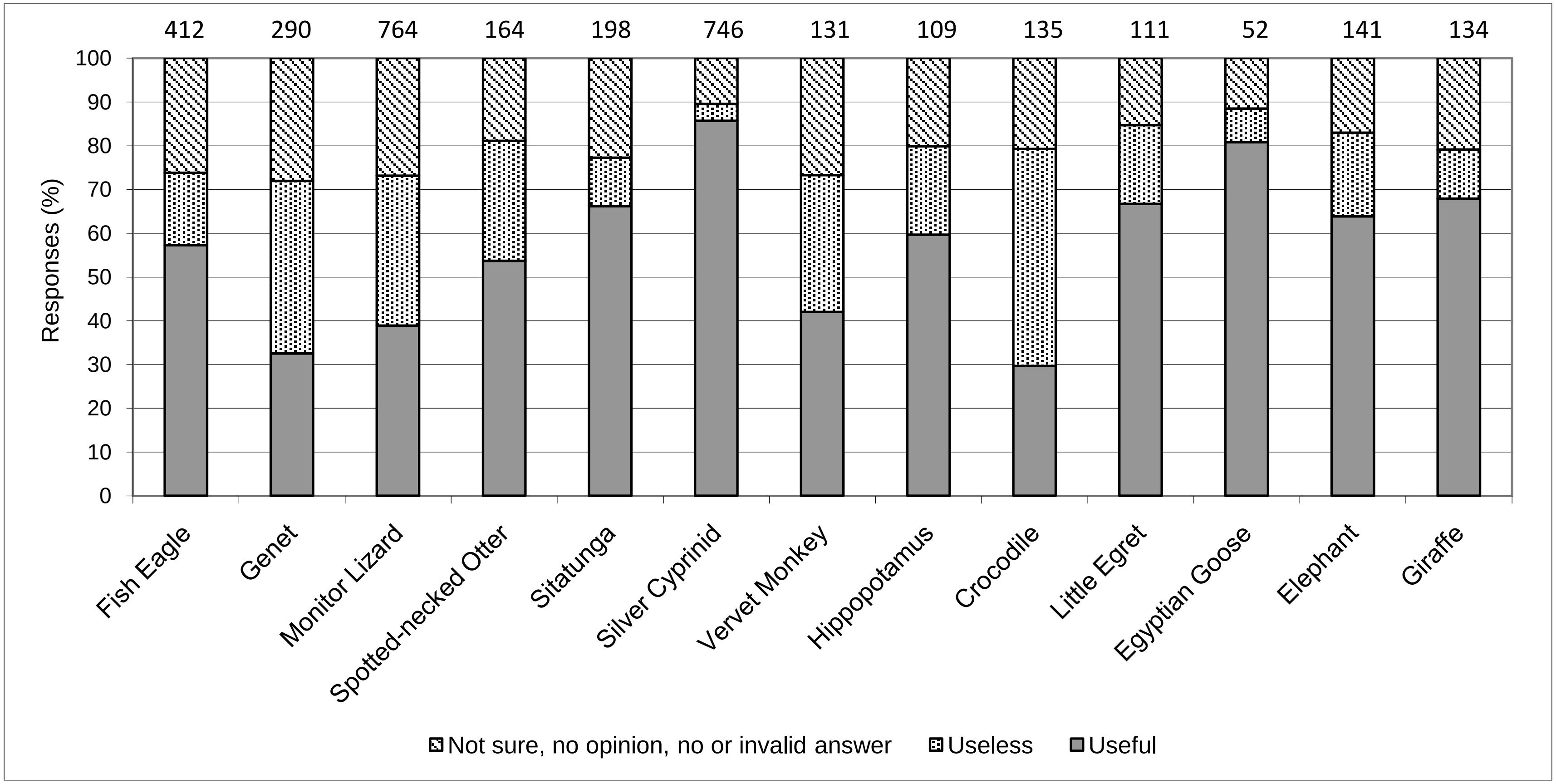


Figure 2.8. The percentage of students participating in my 2008/2009 survey in communities surrounding Rubondo Island National Park, Tanzania, that reported “liking” each of 13 wildlife species. Only the responses of participants able to name the individual species are shown, and the relevant sample size is indicated at the top of each bar.

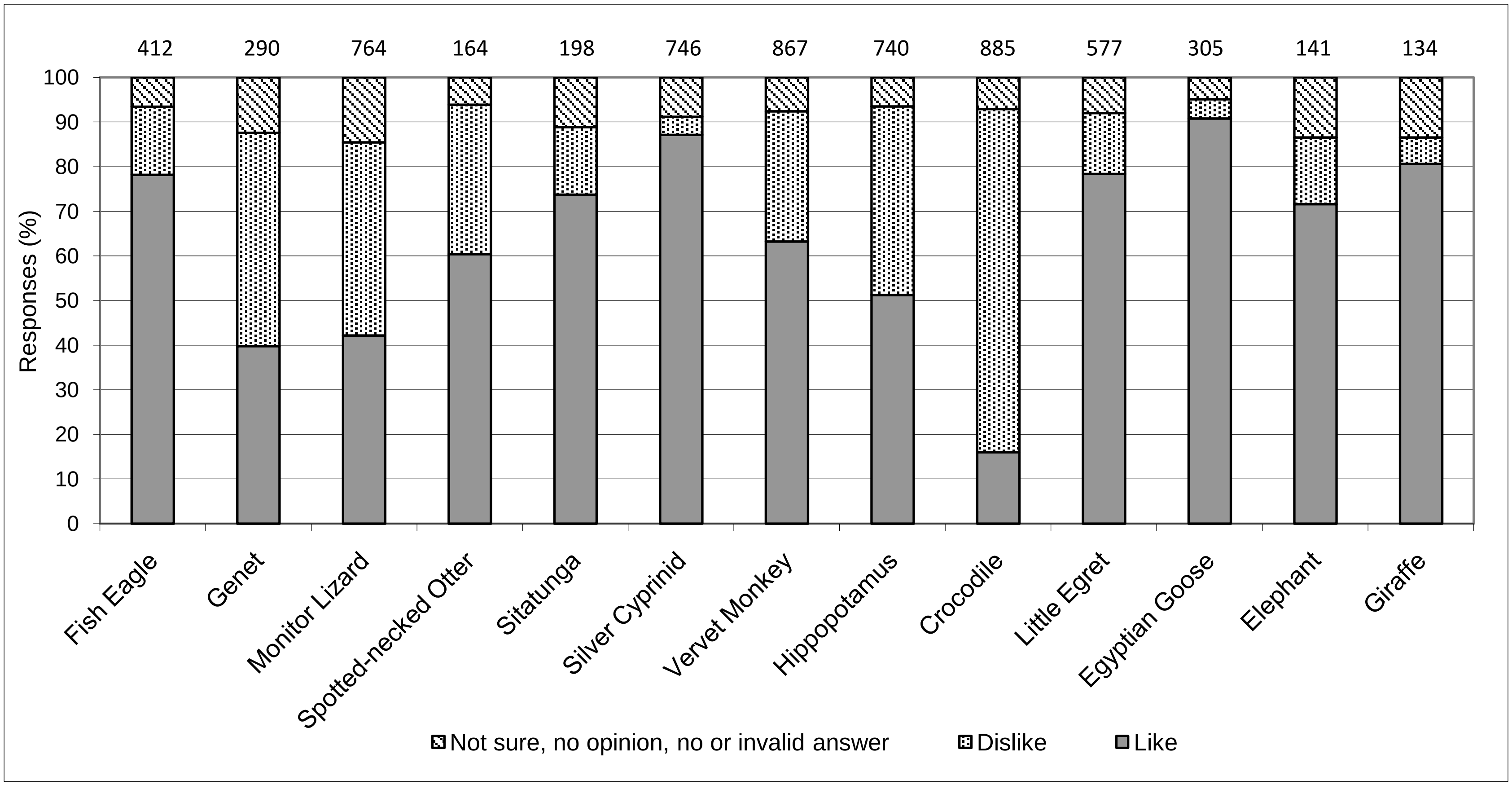
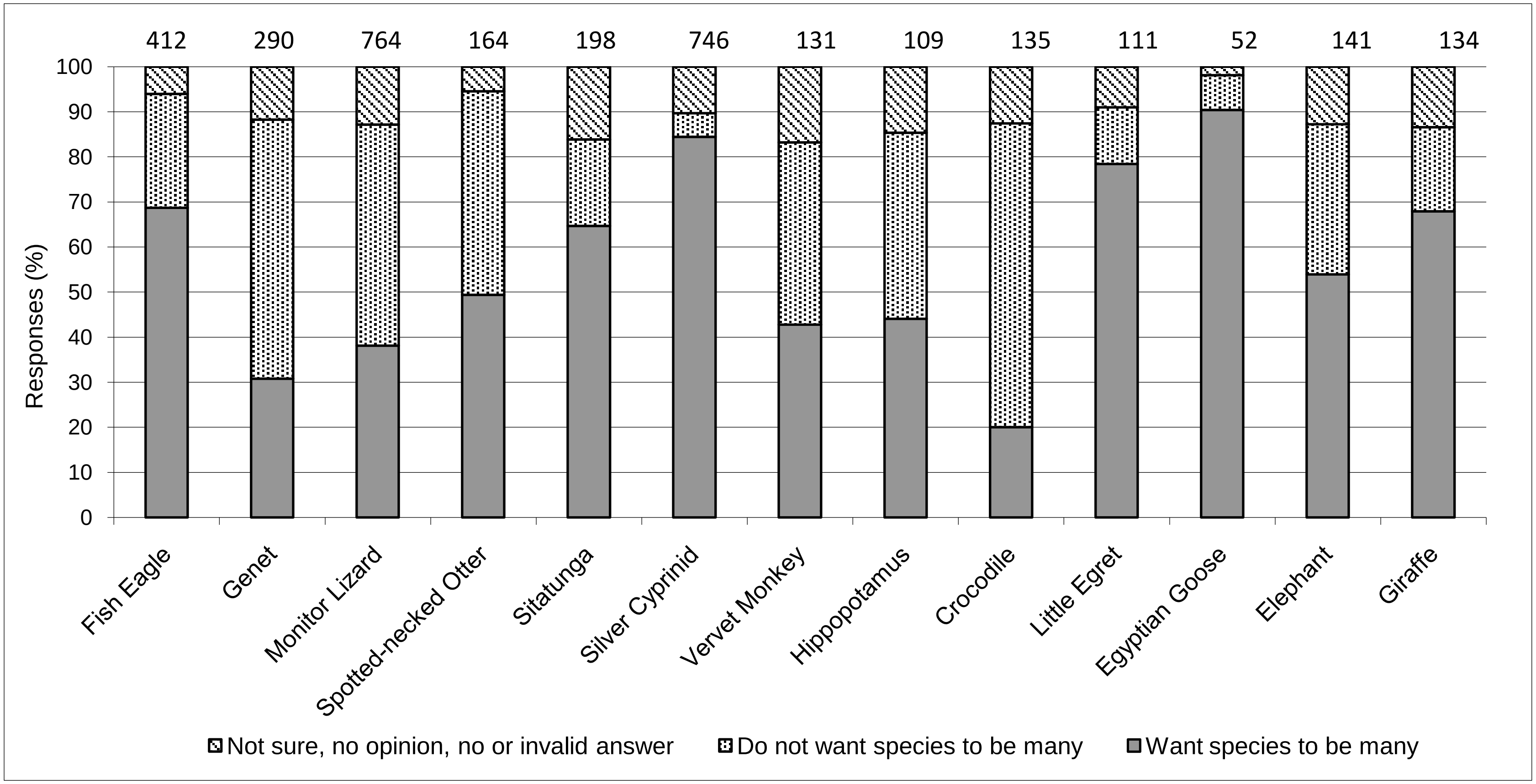


Figure 2.9. The percentage of students participating in my 2008/2009 survey in communities surrounding Rubondo Island National Park, Tanzania, that wanted each of 13 wildlife species to be abundant in their communities. Only the responses of participants able to name the individual species are shown, and the relevant sample size is indicated at the top of each bar.



CHAPTER 3

FAMILIARITY WITH WILDLIFE AND SPECIES PREFERENCES OF CHILDREN NEAR RUBONDO ISLAND NATIONAL PARK, TANZANIA: DO DEMOGRAPHICS MATTER?

Abstract

Conservation and environmental education programs are often developed for children and employ focal species or mascots. However, knowledge regarding children's wildlife preferences—particularly how demographic variables influence their familiarity with, affinity for, and opinions regarding many wildlife species—is limited. Such knowledge, however, could prove useful in choosing the most appropriate mascots for educational programs, and even flagship species for a broader campaign. In this chapter, I assess the influence of demographic variables (gender, school, standard [grade], and select professions held by heads of households) on children's ability to name 13 species (the spotted-necked otter [*Lutra maculicollis*], sitatunga [*Tragelaphus speki*], large-spotted genet [*Genetta tigrina*], Egyptian goose [*Alopochen aegyptiacus*], fish eagle [*Haliaeetus vocifer*], little egret [*Egretta garzetta*], hippopotamus [*Hippopotamus amphibious*], silver cyprinid [*Rastrineobola argentea*], monitor lizard [*Varanus niloticus*], vervet monkey [*Cercopithecus pygerythrus*], crocodile [*Crocodylus niloticus*], giraffe [*Giraffa camelopardalis*], and elephant [*Loxodanta Africana*]) using binary logistic regression descriptively. In addition, I evaluate the influence of each demographic variable on children's "dislike" for and desire to live near "few" of each species using binomial logistic regression and an information-theoretic approach. All demographic variables included, with the exception of having a head of household involved in farming, explained some variation in students' ability to name at least 1 species. No model explained "dislike" for sitatunga, Egyptian geese, elephants,

and giraffes, nor preferences for "few" crocodiles, Egyptian geese, and little egrets better than the respective null models. However, other models for "disliking" and wanting "few" of a species explained variation in the data better than the null. Each demographic variable measured explained some variation in children's affinity and preferences regarding wildlife. Regardless, measurement and modeling of the demographic variables included in this study appears to hold little promise as a method for predicting children's wildlife preferences.

Introduction

Conservation and environmental education programs often are developed for children (Eagles and Demare 1999, Vaughan et al. 2003) and, in conservation education in particular, specific species are regularly used as foci or mascots for such programs (e.g., Jacobson and Padua 1995). However, understanding factors influencing children's wildlife preferences—and particularly how demographic variables influence those preferences—is limited. Available information suggests there often are differences in children's wildlife familiarity and preferences between genders, with researchers often reporting boys to be more positive about (Westervelt and Llewellyn 1985, Kellert and Westervelt 1983, Bjerke et al. 1998*a*, Prokop and Tunnicliffe 2008), more knowledgeable about (Kellert 1985*b*, Kassilly 2006), and less afraid (e.g., reporting certain animals to be less "scary" or "dangerous"—Bjerke et al. 1998*a*) of many animals than girls. Other research has shown younger children to have more affinity for animals (wild and domestic) and more interest in wildlife than older children (e.g., Bjerke et al. 1998*a*). Younger children also have been reported to have more favorable attitudes toward the environment (e.g., Leeming and Dwyer 1995, Alp et al. 2006) (although this has been contradicted—see Alp et al. 2006 for review) and different wildlife value orientations (e.g., Kellert and Westervelt 1983, Bjerke et al. 1998*a*) than older children. Among locations and cultures, environmental attitudes (Skogen 1999, Zecha 2010) and wildlife values (Kellert and Westervelt 1983, Bjerke et al. 1998*a*), preferences

(Entwistle and Stephenson 2000, Bjerke et al. 1998*a*), and knowledge (Kassilly 2006) among youth have been reported to differ as well.

Children's attitudes toward other topics (e.g., politics, race, and gender roles) often are influenced by the attitudes of their parents (Branch and Newcombe 1986, Cunningham 2001, Kent Jennings et al. 2009). Adults' professions can put them into direct conflict with wildlife. Ranchers, for example, lose livestock to large predators, farmers lose crops to herbivores (summary in Thirgood et al. 2005), and hatchery owners lose fish to piscivores (e.g., otters—Ludwig et al. 2002, Kruuk 2006). Although the effect of such interactions and their influence on individuals' attitudes likely widely varies, people experiencing conflict with a species have been reported to have more negative attitudes toward the offending species (e.g., American beavers [*Castor canadensis*], Jonker et al. 2006) or living with the offending species (African lions [*Panthera leo*], Hemson et al. 2009) than people not experiencing conflict. In North America, negative attitudes toward bears have been described among livestock producers, loggers, and miners (Kellert 1994), and, in Norway, living on a livestock-producing farm during youth has been associated with negative attitudes toward wolves (*Canis lupus*) (Bjerke et al. 1998*b*). However, people involved in professions that put them in more regular contact with wildlife, like farming, fishing, and livestock keeping, likely also have increased knowledge of various species.

Results of a survey I conducted around Rubondo Island National Park (Rubondo), Tanzania, suggest that children in the area are comparatively least familiar with (i.e., least able to name an animal based on an illustration) the spotted-necked otter (*Lutra maculicollis*), sitatunga *(Tragelaphus speki*), large-spotted genet *(Genetta tigrina)*, and Egyptian goose (*Alopochen aegyptiacus*); fairly familiar with the fish eagle (*Haliaeetus vocifer*), and little egret (*Egretta garzetta*); and quite familiar with the hippopotamus (*Hippopotamus amphibius*), silver cyprinid (*Rastrineobola argentea*), monitor lizard (*Varanus niloticus*), vervet monkey (*Cercopithecus pygerythrus*), crocodile (*Crocodylus niloticus*), giraffe (*Giraffa camelopardalis*), and elephant (*Loxodanta africana*) (Chapter 2; Figure 3.1). Children in the study showed little affinity for or desire to live near genets, monitor lizards, spotted-necked otters, vervet monkeys, crocodiles and hippopotamuses; some affinity for and desire to live near giraffes, elephants, fish eagles, and sitatunga; and high affinity for and desire to live near Egyptian geese, silver cyprinids, and little egrets (Chapter 2; Figure 3.1). My survey was the first I am aware of to ask about several of the species mentioned above. Consequently, to my knowledge, nothing is known about how demographic variables (e.g., gender) affect children's familiarity with and preferences regarding those species. Such knowledge, however, could be of great use. For example, if children disliking a particular species are part of a cohesive group (such as living in the same community or having parents involved in the same professions), no matter how small the group may be, using that species as a mascot for environmental education programs, or especially more generally as a flagship species intended to increase support for conservation, could be unwise. A flagship species about which the target audience's attitudes are polarized may, in fact, become a "mutinous" flagship (Barua et al. 2010). Understanding commonalities among those disliking a species may also help to elucidate the source of that dislike (e.g., conflicts specific to the local area or culture). In addition, such knowledge may enable managers of other protected areas to better understand reactions to wildlife among their local constituencies and thereby respond most appropriately to conflicts.

I assessed the relationship of several demographic variables I hypothesized to be associated with wildlife preferences—school (also representing community), standard (grade), parental profession (particularly farming, fishing, and livestock keeping), and gender—on students familiarity with, affinity for and desire to live near 13 wildlife species present at Rubondo. I expected that girls would be less likely to be familiar with all species, and more likely than boys to dislike potentially dangerous species and want few of them. I did not expect differences in affinity for and preferences regarding a species among communities in cases where abundance of the animals or interactions with those animals were similar, or among standards generally because the age range was narrow. However, I did expect some differences in preferences among standards and schools based on varying levels of previous exposure to environmental education efforts or curriculum. Lastly, I expected that children whose heads of household (HOH) were in professions that come into contact with a wildlife species would more likely be familiar with those species, and children with HOHs in professions likely to come into conflict with a species would be more likely to dislike that species and want few of the animals to live nearby.

Methods

Study Area

The survey was conducted in 7 communities surrounding Rubondo (see Chapter 2 for detail). Livelihoods in such rural regions of Tanzania are largely dependent on fishing and agriculture; 89% of people in those regions report owning land for agricultural purposes (National Bureau of Statistics 2002). At least 35 of Tanzania's >130 different ethnic groups (Ndembwike 2006) are represented in the study area, the most common of which are Sukuma, Zinza, Jita, and Kerewe (Chapter 2).

The Survey

The survey was administered to 686 children in public primary school Standards 6 and 7 among 6 of the study communities in May-June, 2008, and to 246 additional Standard 4, 5, 6, and 7 children in 3 public primary schools (1 of which was also included in 2008 surveys) in February, 2009. One hundred and forty-one of the 2009 participants were given a revised version of the survey instrument. Each version asked that students name the animal species depicted in a series of illustrations, and then answer "opinion" questions about the illustration, including: "Do you like this animal?" and "Would you like many of these animals where you live?" The original version of the survey included questions about 11 wildlife species: the fish eagle, large-spotted genet, monitor lizard, spotted-necked otter, sitatunga, silver cyprinid, vervet monkey, hippopotamus, crocodile, little egret, and Egyptian goose. However, students were not asked for their preferences regarding abundance (i.e., if they would like many of the animals where they live) for the last 5 species. In the revised version of the survey, students were asked for their abundance preferences regarding those 5 species as well as all others previously included. In addition, students were asked about 2 new species: the elephant and giraffe. I collected the following demographic information from students in both 2008 and 2009: standard, school, and profession of HOH. In addition, all students participating in surveys in 2009 were asked for their gender (whereas in 2008 they were not).

The Data

Individual animal labels provided by each student were classified as "acceptable" or "unacceptable" (see Chapter 2 and Appendix C). For each species, the responses to "opinion" questions (i.e., "Do you like this animal?" and "Would you like many of these animals where you live?") of students unable to correctly identify the illustration were discarded. Therefore, sample size for each "opinion" variable differed based on children's ability to identify the species, as well as whether the species/question was included in the original version of the survey (Table 3.1). In preparing the "opinion" variables for use in analysis, I combined responses of "yes", "not sure", and "no opinion" because I was most interested in children with negative perceptions of a species (i.e., not liking the species and not wanting many of the animals nearby). I also created individual variables for common HOH professions most likely to come into contact with or have potential conflict with wildlife (i.e., farmers, fishers, and livestock keepers). Because of the 2 versions of the survey and the inclusion of the question regarding gender on all surveys administered in 2009, the sample of students asked various demographic questions differed (Table 3.2).

Data Analysis

Modeling

Binary logistic regression was used descriptively (Berk 2004) to assess demographic influences on ability to name the fish eagle, large-spotted genet, monitor lizard, spotted-necked otter, sitatunga, silver cyprinid, vervet monkey, hippopotamus, little egret, and Egyptian goose (i.e., species that <90% of participants were able to “correctly” name—Figure 3.1). Binary logistic regression also was used to model the influence of demographic variables on “disliking” and wanting “few” of each species among students able to name that species (Vaske 2008). Unlike for models describing ability to name species, the information-theoretic approach (Burnham and Anderson 1998) was used to select the “best” model for “disliking” and wanting “few” of each species. The 2 different approaches to modeling were used for familiarity models (i.e., models that describe the influence of demographic variables on ability to name species) versus affinity models (i.e., models that describe the influence of demographic variables on “dislike” for a species) and abundance models (i.e., models that describe the influence of demographic variables on wanting “few” of a species) because I saw little utility in attempting to predict familiarity with each species (and therefore little incentive to develop the most parsimonious model for explaining the data), but being able to predict disliking and not wanting to live near different species could be useful in informing outreach campaigns. The analyses done here represent the first steps toward the potential development of predictive models for those variables.

Model Building. Familiarity models, as well as sets of candidate affinity models and abundance models were developed. Sets of candidate models included all possible relevant combinations of independent variables. Because participants were only asked for their gender in 2009, I developed 2 model sets for each of the 3 types of dependent variables (familiarity, affinity, and abundance) for all species included in both the original and revised versions of the survey (Table 3.3). One set included only responses of 2009 participants, enabling the inclusion of the independent variable “gender”, and the other included data from 2008 as well as 2009, but not the independent variable “gender” (which was not measured in 2008). In 2009 affinity and abundance model sets, interaction terms for gender and each of the included HOH professions also were developed and included in the list of potential independent variables.

Model Selection. Akaike's Information Criterion (AIC) was used to select the most parsimonious models in each affinity and abundance set (Burnham and Anderson 1998). A small sample bias correction (AIC_c) was used whenever the number of observations per variable was <40 for the global model (Burnham and Anderson 1998). For each type of dependent variable (e.g., fish eagle "dislike"), I began assessments with the model set based on 2009-only data. If gender was not included as a variable in the 2009 model with the lowest AIC/AIC_c value, the whole set of models that contained only 2009 data was discarded and I focused all further assessments on the model set based on the combined 2008 and 2009 data. Because there is substantial support for all models ≤2 AIC/AIC_c units from that with the lowest AIC/AIC_c value (Burnham and Anderson 2004), each model in the set within that range was considered a "top candidate model" and included in interpretation. I calculated Akaike weights (w_i) for all top candidate models (or the top 5 models of each set, if the number of top candidate models was <5) (Burnham and Anderson 1998). Using the metrics above and knowledge regarding the variables included in each model, an "optimal model" given the data (if any) was then chosen from among the set of top candidates for each model set.

Model Interpretation. For all of the familiarity models the significance of individual coefficients was assessed using *z*-tests (Long and Freese 2006), with an outcome considered significant at $\alpha = 0.10$. For the optimal affinity and abundance models, Likelihood Ratio χ^2 and Hosmer-Lemeshow goodness-of-fit statistics (Hosmer and Lemeshow 2000, Long and Freese 2006) were calculated whenever ties did not result in the number of distinct quantiles being <6 (which frequently happens when predictor variables are categorical and few—Becketti 1995), as were several pseudo-R^2 statistics, including McFadden's, McKelvey and Zavoina's, Cragg-Uhler's (Nagalkerke's), Effron's, and Adjusted Count. Although generally not considered reliable for making decisions regarding models (Long and Freese 2006, UCLA undated) and not acceptable for diagnostic tests, empirical researchers often explicitly or implicitly make rough comparisons of "goodness of fit" based on pseudo-R^2 measures across similar empirical models with similar samples (Veall and Zimmerman 1996). Reporting of these values, regardless of their incomparability (Long and Freese 2006, UCLA undated) was deemed important in this case because many indicated very poor levels of explanation in the model.

Univariate Analyses

In addition to modeling, I used separate Pearson's chi-square analyses to further assess the effect of the variable "gender" on "disliking" and wanting "few" individuals of each species nearby (Vaske 2008). Although such mixing of univariate and multivariate techniques is generally not recommended, chi-squared analyses were particularly useful in interpreting results when sample sizes fell below levels recommended for binary logistic regression.

Data were analyzed using Stata/IC 11.0 (StataCorp, College Station, Texas 77845, USA) with the SPost add-on (Long and Freese 2006) for analyses related to logistic regression and estout (Jann 2005, 2007) for associated tables.

Results

Modeling

Model Building and Selection

For each of the affinity and abundance data sets, up to 47 candidate models were created using listwise deletion. For most affinity and abundance dependent variables, I considered between 1 and 12 models top candidates (Appendix D1 and D2). Generally, the choice of the optimal model from among the top candidate models was clear, with the top model having a substantially greater w_i and being more parsimonious than the next best model. Further detail is given below when that was not the case.

Affinity. "Gender" was not included in the top model based on 2009 data only for any species also included in the 2008 survey, other than the vervet monkey. For the 2 species with only 2009 data available—the elephant and giraffe—none of the top models were considered “optimal.” The 7 models for elephant that were ≤2 AIC_c units of the top model contained among them most of the possible variables in differing combinations (all resulting in w_i ranging from 0.187 to 0.113), indicating that each of the variables made a similar, and likely insubstantial, contribution. Similarly, for the giraffe, the 12 top candidate models, together containing each of the possible variables, all had w_i between 0.127 and 0.050, suggesting that none has a substantially greater level of support than any other and, therefore, none were likely useful in a practical sense.

Given that “gender” only appeared to be an important variable for the vervet monkey model and no model was optimal for the elephant and giraffe, I was left with only model sets created from the combined 2008 and 2009 data with the exception of the vervet monkey. Within each model set, the model with the lowest AIC/AIC_c score was considered optimal for all species but the sitatunga and little egret (Appendix D1). In the case of the sitatunga, the 2 top candidate models from the combined 2008/2009 dataset had lower AIC_c scores than the null. However, each also had nearly the same w_i as the null (range: 0.211 for the lowest scoring model to 0.202 for the null), and consequently I did not consider any affinity models “optimal” for that species. For the little egret, the 2 lowest-scoring of the 5 top models had very similar w_i (0.272 vs. 0.265), and the top model contained an additional variable (“HOH livestock keeper”). I chose the model with the second-lowest AIC value as the optimal model based on knowledge of that additional variable’s relationship to the most commonly accepted name for the species[i].

Abundance. Among the species with top abundance models based on 2009 data that I also asked about in 2008 (i.e., fish eagle, genet, monitor lizard, sitatunga, and silver cyprinid—see Table 3.3), “gender” was a significant variable for the silver cyprinid and fish eagle. Consequently, only the top 2009 candidate models were considered in the choice of an optimal model for those 2 species. The optimal models for the vervet monkey, hippopotamus, crocodile, little egret, Egyptian goose, giraffe, and elephant also were chosen among the top 2009 candidate models only due to limited sampling for those variables/species (i.e., questions about their abundance only being included in the revised version of the survey) (Table 3.3).

I considered 1 abundance model optimal for 10 of the 13 species included in the survey. No model described abundance preferences regarding the crocodile or little egret better than their respective nulls. Additionally, although 1 of my Egyptian goose models had an AIC_c score lower than the null and was fairly well-supported ($w_i = 0.364$, Appendix D2), I did not consider any model optimal for the species because the model with the lowest score included only the static variable “son of a fisher” (likely because of the low frequency of fishermen HOHs in the sample and the prevalence of participants wanting many Egyptian geese generally),and the model with the second-lowest AIC_c score (Δ $AIC_c = 1.090$, $w_i = 0.211$) was the null.

In contrast to the above, the giraffe model with the lowest AIC_c value was included among the optimal models, although also including variables with no variation (“Standards 4 & 5” and “Standard 7”). However, the model should be approached with skepticism, as these 2 perfect predictor variables resulted in the very high w_i (0.886, Appendix D2) of the model. In addition, the number of students from each standard that participated in the survey was uneven among schools for questions regarding this species and therefore the effective difference may be more accurately attributed to variation among schools. The next best model for giraffe abundance did contain only the variables for “school,” but had a w_i of only 0.036 and was 6.392 AIC values larger than the optimal model (Appendix D2).

For the hippopotamus, the model with the lowest AIC_c value was not strongly supported. The w_i was only 0.282 for that model versus >0.220 for the next 2 models (Appendix D2). Additionally, 9 models were ≤2 AIC_c values from that with the lowest score. However, the lowest-scoring model was the most parsimonious of all the top candidate models, and so was chosen as the optimal model although it was not strongly supported.

Model Interpretation

Familiarity. Boys were more likely to provide an acceptable name for the fish eagle, genet, monitor lizard, spotted-necked otter, hippopotamus, and little egret than girls (Table 3.4a). The odds ratio was greatest for genets, with the odds of a boy being able to name the species >4 times greater than the odds of a girl being able to do so. (Note: The influence of gender on ability to name the vervet monkey was not assessed because in 2009, when gender was measured, >90% of participants were able to name the species.)

For every species, at least some of the "school" variables had detectable influence on students' familiarity with a species, and students from different schools often varied greatly in their ability to name a species (Table 3.4b). For example, the students from Katemwa were much less likely than those from Butwa to be able to name the genet (Odds Ratio [OR]: 0.156; CI = 0.089, 0.274; $p < 0.001$), but were more likely to be able to name the sitatunga (OR: 3.091; CI = 1.478, 6.464; $p = 0.003$). At least 1 of the "standard" variables (i.e., 4 & 5, 6 or 7) had detectable influence on students' ability to name every species but the fish eagle, silver cyprinid, vervet monkey, and hippopotamus (Table 3.4b).

Children whose HOHs were farmers generally were no more or less likely to be able to name any species than those with HOHs in other professions. Although a difference was detected for 1 species, the monitor lizard, even in that case the confidence interval for the odds ratio included 1 (OR: 0.708; CI = 0.476, 1.053; $p = 0.088$). Children whose HOHs were fisherman were more likely than those without a HOH involved in fishing to be able to name the spotted-necked otter (OR: 2.128; CI = 1.139, 3.974; $p = 0.018$) and the Egyptian goose (OR: 1.994; CI = 1.223, 3.251; $p = 0.006$). Children whose HOHs were livestock keepers were less likely than those without livestock keeping HOHs to be able to name the genet (OR: 0.353; CI = 0.168, 0.742; $p = 0.006$) and the Egyptian goose (OR: 0.509; CI = 0.264, 0.979; $p = 0.043$).

Affinity. In total, I considered 9 species to have optimal affinity models: fish eagle, genet, monitor lizard, spotted-necked otter, silver cyprinid, vervet monkey, hippopotamus, crocodile, and little egret (Table 3.5). The model for fish eagle included “school” and “standard” variables. “School” alone was in the best model for genet, and “standard” alone was in the best model for monitor lizard, crocodile, and little egret. “Standard” and “HOH fisherman” (with children of fishermen less likely to “dislike” the species) were in the optimal model for the spotted-necked otter, whereas “HOH fisherman” was the only variable in the optimal model for the silver cyprinid (with those students more likely to “dislike” the species). The best model for hippopotamus included only “HOH livestock keeper” (with students with HOHs involved in the profession less likely to “dislike” the species). The best model for vervet monkey included “gender” and “HOH farmer,” as well as the interaction term for those 2 variables. Females and those with HOHs involved in farming were more likely to “dislike” vervet monkeys.

The Hosmer-Lemeshow statistic indicated that fit was good for the fish eagle optimal model, but could not be reliably assessed for the genet (although other top candidate models were shown to have an acceptable fit, and each contained only 1 additional variable), monitor lizard, spotted-necked otter, hippopotamus, crocodile, silver cyprinid, vervet monkey, and little egret optimal models because ties resulted in the number of distinct quantiles being <6. The 5 pseudo-R^2 values calculated for each optimal model all suggested that the silver cyprinid, hippopotamus, and crocodile models explained a very small amount of the variance in the data (Table 3.5).

Abundance. I considered the fish eagle, genet, monitor lizard, spotted-necked otter, sitatunga, silver cyprinid, vervet monkey, hippotamus, elephant, and giraffe to have optimal abundance models (Table 3.6). The optimal models for fish eagle and silver cyprinid both included only “gender”, with males more likely not to want to live near many of both species. However, in the case of the silver cyprinid the confidence intervals for the odds ratios included 1 (Appendix D2). The only other species for which “gender” was a significant variable was the vervet monkey, with males less likely to want “few” of the species. “School” was included in the optimal models for the genet, monitor lizard, spotted-necked otter, vervet monkey, and hippopotamus. “Standard” was included in the optimal models for the monitor lizard, spotted-necked otter, sitatunga, elephant, and giraffe. Parental profession variables were included in the optimal models only for the genet, monitor lizard, and vervet monkey. The genet was less likely to be unwanted by children with a farmer as the HOH, and was more likely to be unwanted by children with a livestock keeper as the HOH (although only 10 such participants properly named the species, none of them wanted genets to be abundant nearby). The monitor lizard was more likely to be unwanted by children with a livestock keeper as the HOH. The optimal abundance model for the vervet monkey contained all 3 measured professions, and students with HOHs in each were more likely not to want the species nearby.

The Hosmer-Lemeshow goodness-of-fit statistic was valid (i.e., there were not too few ties for the statistic to be reliable) for the optimal genet, monitor lizard, spotted-necked otter, and vervet monkey models. In all cases the statistic indicated that fit was acceptable. The optimal abundance models generally had higher pseudo-R^2 values than the optimal affinity models. The only species that had no pseudo-R^2 values >0.100 for the optimal abundance models were the silver cyprinid and hippopotamus.

Univariate Analyses

Differences between genders were detected in “dislike” and/or desire for “few” of the elephant, vervet monkey, and fish eagle. Males were less likely to “dislike” the elephant and less likely to both “dislike” and want “few” of the vervet monkey (Table 3.7). Females were less likely to want “few” of the fish eagle.

Discussion

Models I developed using the measured variables “school,” “standard,” “gender,” and “HOH profession” provide useful insights regarding students’ familiarity with and perceptions of many of the species included in my surveys. Variation in “dislike” among children from different schools for fish eagles, genets, and vervet monkeys, and in preference for “few” genets, monitor lizards, and spotted-necked otters likely are a combined result of local interactions with each of the species, local abundance, and perhaps slight differences in behavior or livestock/farming practices between communities. Each of the species is thought, at least to some extent, to either raid crops or fishing nets or prey upon or otherwise negatively impact livestock (S. S. S., unpublished data). As was reported by Bjerke et al. (1998*a*) in regards to children's perceptions of carnivores among different regions of Norway, children in communities within my study area that experience more intense conflicts with a species may have less preference for that species.

Students in none of the Standards (4 and 5, 6 or 7) (which appeared as variables in the optimal abundance models for the sitatunga, elephant, and giraffe; in the affinity models for fish eagle, crocodile, and little egret; and in both types of models for the monitor lizard and spotted-necked otter) were consistently more likely to "dislike" animals or want them to be "few." For example, participants in Standard 6 were less likely than those in Standard 7 to "dislike" the crocodile and little egret, but more likely to "dislike" the fish eagle, monitor lizard, and spotted-necked otter. In all cases except "dislike" for the fish eagle and wanting "few" of the monitor lizard and spotted-necked, "school" was not also included as a variable in the optimal models. Therefore, these differences likely cannot be fully attributed to the influence of individual teachers, peer groups, or the survey administration environment. Additionally, the pattern of differences among standards did not align with any known conservation education activities or the national curriculum (H. Mwamjengwa, Rubondo Island National Park, personal communication). Unequal sampling among standard and school further complicates interpretation of the variable's influence. In most cases, sample size among schools and standards was dictated largely by the availability of students in target standards (6 and 7) at the time of my visit. However, in Butwa, teachers requested to fill additional classroom space during survey administration with students from Standards 4 and 5. Although that was not the intended survey audience, I included Standard 4 and 5 students' responses in analysis to help counter small sample sizes caused by the generally limited ability of participants to name several of the included species. Consequently, however, the variable “Standards 4 and 5” contains only students from Butwa handpicked by the teacher for participation.

Because of unequal sampling, interpretation of the differences among standards in perceptions of the wildlife species discussed here should be approached with caution. The inclusion of “standard” as a variable in the optimal model for a species may be indicative of the generally poor descriptive ability of the model, or another variable that I did not measure may be fluctuating in a similar pattern and thereby making “standard” appear more important than it otherwise would (e.g., participants in the same standard—and therefore of similar age—may share an experience I did not measure). However, differences in attitudes among children of similar ages have been reported for other topics. For example, differences in environmental attitudes were reported among younger and older children (Leeming and Dwyer 1995), and even among 6th and 7th/8th grade students (Şahin and Erkal 2010). Complex fluctuations with age also have been reported in regard to wildlife value orientations (Kellert and Westervelt 1983, Kellert 1985*b*, Bjerke et al. 1998*a*).

The apparently greater familiarity with nearly all species included in the survey among boys is similar to the results of others who also reported that boys were more knowledgeable about wildlife (Kellert 1985*b*, Kassilly 2006). Gender also appeared to be important in influencing affinity for vervet monkeys, as well as abundance preferences regarding that species, the fish eagle, and the silver cyprinid. The increased likelihood of girls “disliking” and wanting “few” of the vervet monkey is not surprising given other researchers’ reports suggesting that girls tend to be more fearful and hold more negative attitudes toward wildlife (Westervelt and Llewellyn 1985, Kellert and Westervelt 1983, Bjerke et al. 1998*a*, Prokop and Tunnicliffe 2008). In addition, girls in Tanzania are said to complain of being chased by vervet monkeys more than boys (B. Amulike, personal communication, Frostburg State University). The increased likelihood of boys wanting “few” fish eagles and silver cyprinid, however, is more unexpected.

Children with fishing HOH's being less likely than others to "dislike" the spotted-necked otter, which takes fish from nets (Lejeune 1989), and more likely to "dislike" the silver cyprinid initially appears counterintuitive. However, "like" is a widely encompassing term that does not, for example, exclude responses to opinions of that animal as a food—a food that is likely more regularly eaten by the children of fishermen. "Dislike" of fish could also stem from factors as seemingly extraneous as the HOH's time spent away on fishing trips, or the participant's dislike of associated chores. As for spotted-necked otters, although the species is known by local people to take fish from nets (S. S. S., unpublished data), the behavior may not occur often enough to be considered problematic. In addition, research conducted on adults in other areas of the world suggests that conflict does not always lead to "dislike" of a species.[ii] For example, researchers in an area of southern Brazil reported that most livestock owners in their study liked jaguars, commonly considered predators of livestock, and liking did not decrease among those owning herds that had experienced predation problems (Amorim Conforti and Cascelli de Azevedo 2003). Researchers in Botswana also reported that local people who had lost stock to lions were no more likely than others to dislike the species (Hemson et al. 2009). In my study, children with a HOH involved in fishing were, however, just as likely as participants in general to want "few" otters, which is a more practical and specific measure.

Children with HOHs involved in farming were more likely to "dislike" and want "few" vervet monkeys. This result was not unexpected based on the species' reputation as crop raiders and history of conflict with farmers (Saj et al. 2003; S. S. S., unpublished data). Children with a HOH involved in farming also were less likely to want "few" genets, which could indicate belief among those students that genets control populations of small mammals that are crop pests. In Britain, adult farmers' negative attitudes toward polecats (*Mustela putorius*) are balanced by a belief that the animals control pest species (Packer and Birks 1999). Regardless of the reason, children with a HOH involved in farming do clearly exhibit some differences in wildlife preferences in comparison with their peers.

Similar distinctions were discovered for children with livestock keeper HOHs, who were more likely to want “few” genets (known to eat chickens—S. S. S., unpublished data), monitor lizards (known to eat eggs and are thought to break the legs of cows—S. S. S., unpublished data), and vervet monkeys. Children of livestock keepers were less likely than others to “dislike” hippopotamuses, which are feared both in my study area (S. S. S., unpublished data) and elsewhere in Tanzania (Kaltenborn et al. 2006*b*). Fear of and dislike for the species appear to be related, as local adults reported that the reason for their dislike of hippopotamuses was the animals’ “attacks” on people (S. S. S., unpublished data). Like pet ownership, which is known to influence children’s wildlife values (Kellert and Westervelt 1983, Eagles and Muffitt 1990, Bjerke et al. 1998*a*), constant contact with animals—often large animals—among children of livestock keepers may result in those children being less fearful of, and therefore less likely to “dislike,” hippopotamuses. The increased familiarity of children of livestock keepers with animal behavior, for example, may result in those children better understanding the circumstances that result in humans being harmed by hippopotamuses.

The regular involvement of guardians in multiple professions and the raising of food for personal consumption may have in some instances led to HOH professions appearing less or more important than expected. With almost 90% of Tanzanian households owning land (World Bank 1999, National Bureau of Statistics 2002), many people who do not consider themselves farmers likely grow fruits and vegetables for personal consumption, potentially putting them in conflict with vervet monkeys. Keeping 1 to several chickens is also common among Tanzanian households, and likely has a great influence on perceptions of genets, commonly thought to prey upon poultry (S. S. S., unpublished data). Future surveys should also include questions about whether each participant’s household has a home garden or owns chickens. Additional useful measures regarding children’s preferences may include how much the children assist with fishing, farming, or livestock keeping chores, and professions of additional adults they spend considerable time with. The influence of the professions measured here on the wildlife opinions and preferences of adults practicing them also should be assessed. Regardless, these results indicate that students with HOHs involved in farming, fishing, and livestock keeping do have some different preferences regarding wildlife than their peers. In addition, children's perceptions of several species are influenced by gender, standard, and school.

Akaike's information criterion indicated that my optimal models were all better than the null models for their respective data sets, and, when considered reliable, the Hosmer-Lemoshow statistic indicated that fit was acceptable. However, there is some indication that the models may have limited explanatory power. This limitation is not unexpected given that attitudes, which inform opinions and preferences, are often still developing in youth and subject to change (Branch and Newcombe 1986). This may also help explain in part why some of the preferences and opinions regarding species differ among the Standards (4 and 5, 6, and 7) in my study. Researchers have suggested that as children age (in the context of this study, progress to higher standards), they may be better able to understand and process messages provided by family members, and also may become more highly influenced by peers (Branch and Newcombe 1986). In addition, an abundance of factors not included in my models likely influence wildlife preferences.

The purpose of my study was to assess the variation in children's preferences in relation to readily available demographics that could potentially be used to predict wildlife preferences with minimal effort. However, aside from sociodemographic influences, species preferences (as described here, among adults[ii]) have also been reported to vary with: an individual's general attitudes toward wildlife, childhood environment, and type and amount of exposure to animals in general; how the individual perceives an animal's usefulness, likeability, and attractiveness; and the similarity of the animal to humans (Kaltenborn et al. 2003, Tisdell et al. 2006). Adults' perceptions of a wildlife species also are reported to be influenced by the species' cultural and historic relationships with people, and its size, dangerousness, and likelihood of inflicting property damage (Kellert 1985*a*)—all of which are likely variable depending on whether the animal lives in the vicinity of an individual's home. Perceptions of danger, conflict, and risk, known to influence adults' attitudes toward wildlife species (Kellert 1994, Kaczensky et al. 2004), may also be particularly important influences on the wildlife preferences measured in my study. Based on results from research in related disciplines focusing on children, still other factors likely also influence preferences regarding wildlife. General environmental attitudes among children, for example, have been reported to be significantly related to education level of parents, monthly income status (Şahin and Erkal 2010), talking about the environment at home, watching nature films, and reading about the environment (Eagles and Demare 1999).

In Tanzania, an additional sociodemographic variable that may be particularly important is tribal background. Unfortunately, the high level of tribal diversity in my study area limited the usefulness of the variable in models. Additional research should be conducted to assess tribal beliefs about individual species, though, because those beliefs could help explain several demographic influences suggested by my results. For example, beliefs held by the former inhabitants of Rubondo, the Banyarubondo (a section of the larger Zinza tribe—Kiwango et al., *in prep*), could help explain why males were both more able to name the fish eagle than females and more likely to want the species to be "few." Members of the tribe, many of whom relocated to communities in my study area after Rubondo became a National Park, considered some eagle cries to be bad luck, and an indicator of impending misfortunes. When the cry was heard by a fisherman just prior to embarking on a fishing trip, it meant he would not catch any fish. In Banyarunbondo culture, women going fishing or living in fishing camps was taboo (Kiwango et al., *in prep*). Were such beliefs common in my study area, males would have more reason to be able to identify an eagle and more reason to want eagles to be "few." However, if the beliefs were common, having a HOH involved in fishing also should have been an important variable in affinity and abundance models for the fish eagle and, at least in cases where it was included, the interaction term between HOH fisherman and gender should have been important. Neither was the case. In addition, since girls also are less likely to be able to name the fish eagle than boys, the girls' seemingly increased affinity for and desire to live near fish eagles may instead be the result of the sample of girls able to name the species being especially biased toward those with interest in wildlife generally, or this species in particular. Regardless, the example serves to elucidate the complexities of tribal influence and illustrate the need for additional understanding of cultural relationships with wildlife.

Another consideration in any discussion of the influences on preferences regarding wildlife is that regardless of the number and types of variables included in models of opinions regarding a species, useful results are unlikely if participants have little contact with a species or if all participants have similar experiences with a species. The 2 considerations above likely explain the lack of useful affinity models for the sitatunga, Egyptian goose, elephant, or giraffe, or useful abundance models for the crocodile, little egret, and Egyptian goose. Elephants and giraffes do not occur in any of the communities surveyed, and therefore few, if any, of the children surveyed would have direct experiences with the species. (The populations present on Rubondo were introduced to the Island in the 1960s and 1970s [TANAPA 2003].) The sitatunga occurs in wetland areas (Games 1983), and therefore likely comes into little contact with people in my study area. Adults interviewed in the study area also did express strong feelings about the sitatunga (S. S. S., unpublished data). The little egret and Egyptian goose are both widely popular and considered attractive (Chapter 2), and neither is locally known for causing conflict with humans (S. S. S., unpublished data). The crocodile is highly "disliked" locally (Chapter 2), and the main reason cited by adults for disliking the species is attacks on people (S. S. S., unpublished data). The crocodile's local fame for attacking people (S. S. S., unpublished data) likely results in ubiquitous fear of the species among children in all demographic categories. Crocodiles also are highly feared by adults around Tanzania's Serengeti National Park, regardless of gender, age, or education (Kaltenborn et al. 2006*b*).

Although necessary to ensure that I was measuring perceptions regarding the species intended, limiting these analyses to the responses of participants who provided an "acceptable" name for the included illustration led to samples of <100 for 2009 abundance models for the hippopotamus, fish eagle, genet, sitatunga, and little egret, as well as the 2009 affinity models for the latter 4. Such sample sizes are considered risky for maximum likelihood estimation (Long 1997), and models built with them—or in my case the discarding of such models based on indications that gender was not important—should therefore be approached with caution. However, results of univariate analyses also indicated that gender did not influence the dependent variables for which 2009 models were discarded. Regardless, analyses for variables with samples of <100 ideally should be repeated with a larger sample size to further assess the contributions of each variable included. Similar steps may be wise for particularly well- or poorly-liked species also, because larger samples may be required when the dependent variable varies little (Long 1997).

Summary and Conclusions

Models developed provide some insight into children's familiarity, affinity, and preferences regarding most of the 13 species of wildlife included in my survey. The only 1 of the species previously determined to have the most potential to serve as effective local flagships based on general attractiveness, usefulness, likeability, desirability, and status as native to the area (Chapter 2)—i.e., the fish eagle, sitatunga, little egret, Egyptian goose, and silver cyprinid—that no model was useful in describing either "disliking" or wanting "few" of was the Egyptian goose. At least some demographic variables appear to influence "dislike" and/or desire for "few" of each of the other species. Models suggest that children's standard and school influence their "dislike" for the fish eagle, and that males are more likely to want "few" of the species (although this may not be reliable because of the sample size of <100). No variables were useful in describing "dislike" for the sitatunga, but males were more likely to want "few" of the species. The silver cyprinid affinity model may be of particularly limited use (having no pseudo-R^2 values $\geq$0.04), but nonetheless suggested children with fishermen HOHs were more likely to "dislike" the species than others. Males also were more likely to not want many silver cyprinids. No variables appeared to be useful in explaining wanting “few” of the little egret, and only the variable “standard” appeared to influence “dislike” for the species. Based on the above, additional consideration of the variables included in models should be made before the fish eagle, sitatunga, silver cyprinid, or little egret are used as flagships, given that a species disliked or unwanted by a cohesive group could be a mutinous flagship (Barua et al. 2010)—no matter how small the group may be.

The lack of useful models for some of the 13 species/variables discussed herein may be related to small sample size, which also led to some concern over the reliability of decisions to discard 2009 models (and therefore the variable “gender”) for 5 species, including the fish eagle, sitatunga, and little egret. In addition, pseudo-R^2 levels (which, although not generally considered reliable, are often used as some indication of the amount of variance explained [Long and Freese 2006, UCLA undated, Veall and Zimmerman 1996]) were often low—particularly so in several cases. Although the demographic variables I measured do influence children’s affinity and abundance preferences for some species, the variables may not exert enough influence to make their measurement and modeling a practically useful tool for determining wildlife preferences.

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[i] As noted in Chapter 1, the locally-used name for little egret is the same as that for similar-looking cattle egret (*Bulbulcus ibis*). The children of livestock keepers probably are more likely than peers to spend time in the habitat of cattle egrets (i.e., dry or wet open areas with large herbivores—Zimmerman et al. 2005). Therefore the additional information provided by the lowest-scoring model—which suggests that a child with a livestock keeping HOH was nearly 2 times more likely to dislike the animal (CI = 0.82, 4.39; p = 0.132)—probably most applies to cattle egrets.

[ii] Although research on adults cannot be assumed directly applicable to children, given the limited amount of research on children’s attitudes, preferences, and perceptions regarding wildlife, I believe seeking understanding from research with other audiences is reasonable as long as such comparisons are approached with caution and awareness that results are not directly transferrable.

Table 3.1. Opinion variables measured in my 2008/2009 survey regarding wildlife knowledge and preferences of children in communities around Rubondo Island National Park, Tanzania, as well as the size of the sample of respondents included in these analyses (i.e., those participants both able to correctly name the species and asked the question), and the number/percent of students responding negatively to each (i.e., that "dislike" or want "few" of the species). Except for affinity and abundance variables for the elephant and giraffe and abundance variables for the vervet monkey, hippopotamus, crocodile, little egret, and Egyptian goose (all of which only 2009 participants were asked about), the "potential" sample size for each variable was 932.

Opinion variables	**Sample size** *(i.e., number of students asked and able to name the species)*	**Number of negative responses** *(i.e., "dislike" or want "few" of the species)* **in the sample**	**Percentage of negative responses in the sample**
Affinity for:			
Fish Eagle	412	63	15.3%
Genet	290	138	47.6%
Monitor Lizard	764	331	43.3%
Spotted-necked Otter	164	55	33.5%
Sitatunga	198	30	15.2%
Silver cyprinid	746	30	4.0%
Vervet monkey	867	253	29.2%
Hippopotamus	740	313	42.3%
Crocodile	885	681	76.9%
Little Egret	577	79	13.7%
Egyptian Goose	305	13	4.3%
Elephant[1]	141	21	14.9%
Giraffe[1]	134	8	6.0%
Abundance preferences regarding:			
Fish Eagle	412	104	25.2%
Genet	290	166	57.2%
Monitor Lizard	764	375	49.1%
Spotted-necked Otter	164	74	45.1%
Sitatunga	198	38	19.2%
Silver cyprinid	746	39	5.2%
Vervet monkey[1]	131	53	40.5%
Hippopotamus[1]	109	45	41.3%
Crocodile[1]	135	91	67.4%
Little Egret[1]	111	14	12.6%
Egyptian Goose[1]	52	4	7.7%
Elephant[1]	141	47	33.3%
Giraffe[1]	134	25	18.7%

[1] Only included in 2009 surveys, in which 141 students participated.

Table 3.2. The demographic variables measured in 2008/2009 surveys of students in communities surrounding Rubondo Island National Park, Tanzania; the sample of students asked to provide information regarding the variable; and the frequency of positive responses to each in the sample of students. Sample size used to calculate frequency for all except male (gender) was 932. Only 246 students were asked for their gender, of which 240 provided a response.

Demographic variable	**Number of occurrences in the sample**	**Percentage of occurrences in the sample**
*Gender**		
Female	119	49.6%
Male	121	49.2%
School		
Ikuza**	31	3.3%
Izumacheli**	106	11.4%
Maisome**	103	11.1%
Nkome**	209	22.4%
Butwa	105	11.3%
Katemwa	307	32.9%
Muganza	71	7.6%
Standard		
4 & 5*	16	1.7%
6	523	56.1%
7	393	42.2%
HOH profession[†]		
Farmer	553	59.3%
Fisher	109	11.7%
Livestock keeper	61	6.5%

*Only students participating in surveys in 2009 were asked for their gender.
** Only sampled in 2008, and so are not included in the 2009 models that include gender.
***Only sampled in 2009.
[†] Participants commonly listed >1 profession for their HOH. For example, 36% of livestock keeping HOHs farmed, as did 13% of fishing HOHs.

Table 3.3. Check marks (✓) indicate dependent variables included only in the revised version of my 2008/2009 survey of students in communities surrounding Rubondo Island National Park, Tanzania. Because the revised version of the survey was only administered in 2009, when participants were also asked for their gender, only 1 model (or set of models) was developed for each of the indicated variables.

	Dependent Variable/Model Type		
Species	***Familiarity***	***Affinity***	***Abundance***
Fish Eagle			
Genet			
Monitor Lizard			
Spotted-necked Otter			
Sitatunga			
Silver cyprinid			
Vervet monkey			✓
Hippopotamus			✓
Crocodile			✓
Little Egret			✓
Egyptian Goose			✓
Elephant	✓	✓	✓
Giraffe	✓	✓	✓

Table 3.4 (a and b). Models describing the influences of demographic variables on familiarity with 9 wildlife species among students living around Rubondo Island National Park, Tanzania. Models were developed using results from a 2008/2009 survey of children in communities surrounding the Park. Two models were developed for each animal—the first from 2009 data only and including gender as a variable (a), and the second from 2008 and 2009 data combined, but not including gender as a variable (b). (Gender information was not collected in 2008.) The second model for each species also contains additional dummy variables for school because sampling was conducted in more villages in 2008. Confidence intervals are shown in brackets. (Note: LR = Likelihood Ratio.)

a. 2009	**Fish Eagle**	**Genet**	**M. Lizard**	**S-N. Otter**	**Sitatunga**	**S.Cyprinid**	**Hippo**	**L. Egret**	**E. Goose**
	Odds Ratio	Odds Ratio	Odds Ratio	Odds Ratio	Odds Ratio	Odds Ratio	Odds Ratio	Odds Ratio	Odds Ratio
Able to name spp.									
Male	3.479***	4.326***	2.110*	1.985*	1.115	2.003	2.230**	1.843**	1.593
	[1.757,6.889]	[1.794,10.428]	[0.877,5.073]	[0.952,4.138]	[0.646,1.922]	[0.756,5.380]	[1.051,4.735]	[1.010,3.362]	[0.821,3.090]
Muganza Sch.	0.083***	0.010***	0	0	0.48	0.064**	0.149*	0.823	0.115***
	[0.024,0.289]	[0.002,0.051]	[0.000,.]	[0.00,.]	[0.159,1.444]	[0.006,0.622]	[0.022,1.020]	[0.262,2.586]	[0.035,0.380]
Katemwa Sch.	0.057***	0.026***	0	0.274**	1.054	0.667	0.188*	1.359	0.049***
	[0.018,0.183]	[0.007,0.099]	[0.000,.]	[0.096,0.786]	[0.411,2.706]	[0.068,6.590]	[0.034,1.041]	[0.487,3.794]	[0.016,0.154]
Std. 6	2.244	3.129	0.928	0.406	0.574	0.260**	0.394	0.349*	2.464*
	[0.761,6.618]	[0.568,17.238]	[0.207,4.157]	[0.031,5.361]	[0.217,1.523]	[0.071,0.960]	[0.036,4.215]	[0.120,1.007]	[0.846,7.181]
Std. 4 & 5	0.645	8.545	0.943	0.453	0.392	4.55E+05	0.203	0.978	1.082
	[0.111,3.736]	[0.558,130.746]	[0.00,.]	[0.032,6.465]	[0.074,2.066]	[0.000,.]	[0.014,2.979]	[0.130,7.381]	[0.190,6.147]
HOH fisherman	1.563	0.744	0.708	1.265	0.924	0.432	2.337	1.491	1.296
	[0.524,4.658]	[0.197,2.804]	[0.133,3.768]	[0.378,4.235]	[0.353,2.416]	[0.084,2.213]	[0.607,8.991]	[0.488,4.560]	[0.442,3.801]
HOH farmer	1.552	0.400**	0.711	1.004	0.98	0.917	2.062*	1.22	0.633
	[0.762,3.165]	[0.165,0.971]	[0.289,1.747]	[0.428,2.355]	[0.545,1.762]	[0.316,2.660]	[0.947,4.490]	[0.647,2.301]	[0.308,1.301]
HOH livestock keeper	0.578	0.317	1.552	0.875	1.138	1.084	3.12	0.534	0.285
	[0.147,2.275]	[0.047,2.133]	[0.181,13.300]	[0.133,5.769]	[0.379,3.416]	[0.196,6.003]	[0.334,29.109]	[0.176,1.626]	[0.059,1.373]
Constant	0.806	1.836	5.26E+7	1.488	0.994	102.436***	22.639***	3.850*	1.665
	[0.182,3.573]	[0.274,12.322]	[0.000,.]	[0.114,19.389]	[0.270,3.650]	[7.373,1423.009]	[2.693,190.330]	[0.912,16.259]	[0.391,7.084]
LR Chi^2	55.073***	106.216***	14.274*	53.185***	3.880	22.525***	29.286***	11.923	54.049***
McFadden's R^2	0.189	0.390	0.0867	0.230	0.012	0.158	0.133	0.043	0.190

n = 240 for all models

*p < 0.10 **p < 0.05 ***p < 0.01

Table 3.5. The optimal affinity model developed for each species (if any model was considered useful) from the results of my 2008/2009 survey of school children around Rubondo Island National Park, Tanzania. Independent variables included in any optimal model are listed in the first column, and the species' name in the first row. If no value is shown in a cell corresponding to a particular variable/species, that variable was not included in the optimal model for that species. Standard error is shown in parentheses.

b. 2008 & 2009	**Fish Eagle** Odds Ratio	**Genet** Odds Ratio	**M. Lizard** Odds Ratio	**S-N. Otter** Odds Ratio	**Sitatunga** Odds Ratio	**S. Cyprinid** Odds Ratio	**V. Monkey** Odds Ratio	**Hippo.** Odds Ratio	**L. Egret** Odds Ratio	**E. Goose** Odds Ratio
Able to name spp.										
Ikuza Sch.	0.725	0	3.925	1.424	3.175**	4.684**	2.842	4.942	2.299*	0.142***
	[0.311,1.689]	[0.000,.]	[0.471,32.729]	[0.486,4.172]	[1.095,9.211]	[1.007,21.800]	[0.336,24.009]	[0.612,39.906]	[0.933,5.669]	[0.049,0.414]
Izumacheli Sch.	1.838*	0.443***	0.725	8.306***	1.966	0.935	0.364**	0.954	1.477	0.943
	[0.977,3.461]	[0.238,0.822]	[0.292,1.805]	[4.088,16.876]	[0.850,4.543]	[0.459,1.906]	[0.152,0.869]	[0.425,2.144]	[0.812,2.687]	[0.520,1.711]
Katemwa Sch.	0.220***	0.156***	0.382**	0.896	3.091***	2.039**	1.803	0.628	0.812	0.160***
	[0.129,0.375]	[0.089,0.274]	[0.174,0.837]	[0.454,1.765]	[1.478,6.464]	[1.054,3.945]	[0.717,4.536]	[0.317,1.243]	[0.487,1.354]	[0.091,0.281]
Maisome Sch.	0.160***	0.093***	0.270***	1.084	1.609	0.472**	2.435	0.505*	1.384	1.034
	[0.082,0.312]	[0.042,0.203]	[0.116,0.623]	[0.496,2.368]	[0.680,3.807]	[0.240,0.930]	[0.699,8.486]	[0.236,1.080]	[0.758,2.525]	[0.567,1.886]
Muganza Sch.	0.179***	0.050***	0.859	0	3.476***	1.174	2.38E+06	6.163**	2.536***	0.269***
	[0.087,0.369]	[0.016,0.154]	[0.306,2.409]	[0.000,.]	[1.468,8.233]	[0.523,2.632]	[0.000,.]	[1.327,28.628]	[1.265,5.087]	[0.130,0.556]
Nkome Sch.	1.221	1.17	0.459*	0.264***	1.5	1.057	2.38	0.457**	2.777***	0.477***
	[0.708,2.105]	[0.677,2.022]	[0.207,1.021]	[0.109,0.641]	[0.681,3.303]	[0.556,2.010]	[0.846,6.694]	[0.229,0.914]	[1.596,4.833]	[0.277,0.820]
Std. 4 & 5	0.835	17.618***	1.03E+06	5.120***	3.496*	1.91E+06	1.376	0.358	7.203**	1.486
	[0.277,2.515]	[2.191,141.672]	[0.000,.]	[1.570,16.695]	[0.916,13.337]	[0.000,.]	[0.155,12.187]	[0.104,1.238]	[1.519,34.152]	[0.460,4.798]
Std. 6	1.06	2.094***	1.460**	1.541**	1.576**	1.329	0.887	0.923	1.465**	0.713**
	[0.778,1.446]	[1.470,2.984]	[1.017,2.096]	[1.004,2.365]	[1.105,2.248]	[0.938,1.884]	[0.498,1.580]	[0.648,1.315]	[1.090,1.970]	[0.521,0.976]
HOH farmer	0.798	0.844	0.708*	1.291	1.237	1.033	0.896	1.093	1.168	1.011
	[0.574,1.109]	[0.588,1.210]	[0.476,1.053]	[0.817,2.040]	[0.858,1.783]	[0.703,1.518]	[0.478,1.680]	[0.757,1.578]	[0.857,1.592]	[0.714,1.429]
HOH fisherman	1.145	0.862	0.826	2.128**	1.213	1.265	0.813	1.138	1.343	1.994***
	[0.700,1.874]	[0.504,1.475]	[0.444,1.538]	[1.140,3.974]	[0.682,2.156]	[0.695,2.303]	[0.340,1.943]	[0.638,2.031]	[0.828,2.177]	[1.223,3.252]
HOH livestock keeper	1.258	0.353***	0.976	1.446	0.893	1.798	0.545	0.83	0.932	0.509**
	[0.691,2.289]	[0.168,0.742]	[0.457,2.083]	[0.676,3.089]	[0.442,1.804]	[0.818,3.952]	[0.228,1.304]	[0.415,1.660]	[0.532,1.630]	[0.264,0.979]
Constant	1.693*	0.974	9.584***	0.109***	0.080***	2.748***	12.238***	5.655***	0.83	1.261
	[0.939,3.055]	[0.524,1.810]	[4.100,22.402]	[0.049,0.243]	[0.036,0.181]	[1.376,5.488]	[4.317,34.693]	[2.674,11.960]	[0.470,1.467]	[0.695,2.287]
LR Chi^2	176.610***	226.213***	38.319***	171.726***	32.149***	50.020***	45.796***	40.862***	54.780***	140.411***
McFadden's R^2	0.140	0.198	0.044	0.200	0.034	0.055	0.101	0.044	0.0447	0.120

n = 922 for all models

*$p < 0.10$ **$p < 0.05$ ***$p < 0.01$

Table continued from previous page

"Dislike" spp.	**Fish Eagle** Mod3bBESTRef	**Genet** Mod11	**M. Lizard** Mod14b	**S-N Otter** Mod5	**S. Cyprinid** Mod9	**V. Monkey†** Mod5	**Hippo** Mod19	**Crocodile** Mod14b	**L. Egret** Mod8B
HOH fisherman				-0.931*	1.089**				
				(0.538)	*(0.435)*				
HOH livestock keeper							-0.660**		
							(0.33)		
HOH farmer						0.854**			
						(0.431)			
Son of a farmer						0.333			
(Option only for 2009 models)						*(0.685)*			
Constant	-1.332***	-0.406	-0.589***	-1.254***	-3.379***	-1.153***	-0.167**	1.833***	-1.604***
	(0.339)	*(0.646)*	*(0.121)*	*(0.344)*	*(0.227)*	*(0.331)*	*(0.079)*	*(0.155)*	*(0.183)*
LR Chi^2	*37.612****	*21.037****	*25.429****	*11.833****	*5.360***	*16.020****	*4.258***	*9.008***	*5.227**
Log Likelihood	*-153.201*	*-175.847*	*-472.367*	*-95.968*	*-114.635*	*-113.652*	*-475.174*	*-380.384*	*-218.325*
McFadden's R^2	*0.109*	*0.056*	*0.026*	*0.058*	*0.022*	*0.066*	*0.004*	*0.012*	*0.012*
McKelvey & Zavoina's R^2	*0.854*	*0.456*	*0.043*	*0.108*	*0.038*	*0.125*	*0.008*	*0.021*	*0.639*
Cragg-Uhler's (Nagalkerke's) R^2	*0.156*	*0.100*	*0.048*	*0.099*	*0.027*	*0.106*	*0.008*	*0.018*	*0.017*
Efron's R^2	*0.097*	*0.073*	*0.036*	*0.066*	*0.010*	*0.072*	*0.006*	*0.012*	*0.006*
Adjusted Count R^2	*0.000*	*0.198*	*0.119*	*0.019*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
Hosmer-Lemeshow (groups, $\hat{C}$, p)	*7, 6.27, 0.281*	*‡*	*‡*	*‡*	*‡*	*‡*	*‡*	*‡*	*‡*
n	*397*	*269*	*702*	*159*	*694*	*213*	*694*	*824*	*527*

$^*p < 0.10$ $^{**}p < 0.05$ $^{***}p < 0.01$ † Model based on 2009 data only ‡ Ties resulted in too few groups for statistic to be reliable

Table 3.6. The optimal abundance model developed for each species (if any model was considered useful) from the results of my 2008/2009 survey of school children around Rubondo Island National Park, Tanzania. Independent variables included in any optimal model are listed in the first column, and the species' name in the first row. If no value is shown in a cell corresponding to a particular variable/species, that variable was not included in the optimal model for that species. Standard error is shown in parentheses.

Want "few" of spp.	**Fish Eagle†**	**Genet**	**M. Lizard**	**S-N Otter**	**Sitatunga**	**S. Cyprinid†**	**V. Monkey†**	**Hippo†**	**Elephant†**	**Giraffe†**
	Mod25	Mod5	Mod10b	Mod3	Mod5b	Mod13	Mod2	Mod 23	Mod40b	Mod3
Male	2.497**					0.944*	-1.038**			
(Option only for 2009 models)	*(1.070)*					*(0.553)*	*(0.444)*			
Std. 7			-0.598***						-0.303	-17.177
			(0.167)						*(1.240)*	*(.)*
Std. 4 & 5			1.426**	1.735*	-12.561				-2.175**	-17.177
			(0.632)	*(0.978)*	*(706.448)*				*(1.056)*	*(.)*
Std. 6				0.832**	0.906**					
				(0.391)	*(0.435)*					
Butwa Sch.		0.079	-1.060**							
		(0.733)	*(0.453)*							
Katemwa Sch.		0.897	0.259	1.407**			0.977*	0.969**		
		(0.754)	*(0.408)*	*(0.630)*			*(0.504)*	*(0.469)*		
Muganza Sch.		-15.181	-0.806*	0.000						
(Option only for multi-year models)		*(1387.616)*	*(0.465)*	*(.)*						
Nkome Sch.		-0.451	-0.742*	0.263						
(Option only for multi-year models)		*(0.706)*	*(0.408)*	*(0.901)*						
Izumacheli Sch.		0.709	-0.709	0.827						
(Option only for multi-year models)		*(0.783)*	*(0.436)*	*(0.599)*						
Maisome Sch.		0.000	-0.782*	-0.923						
(Option only for multi-year models)		*(.)*	*(0.449)*	*(0.936)*						
Ikuza Sch.				-0.333						
(Option only for multi-year models)				*(1.245)*						

Table continued from previous page

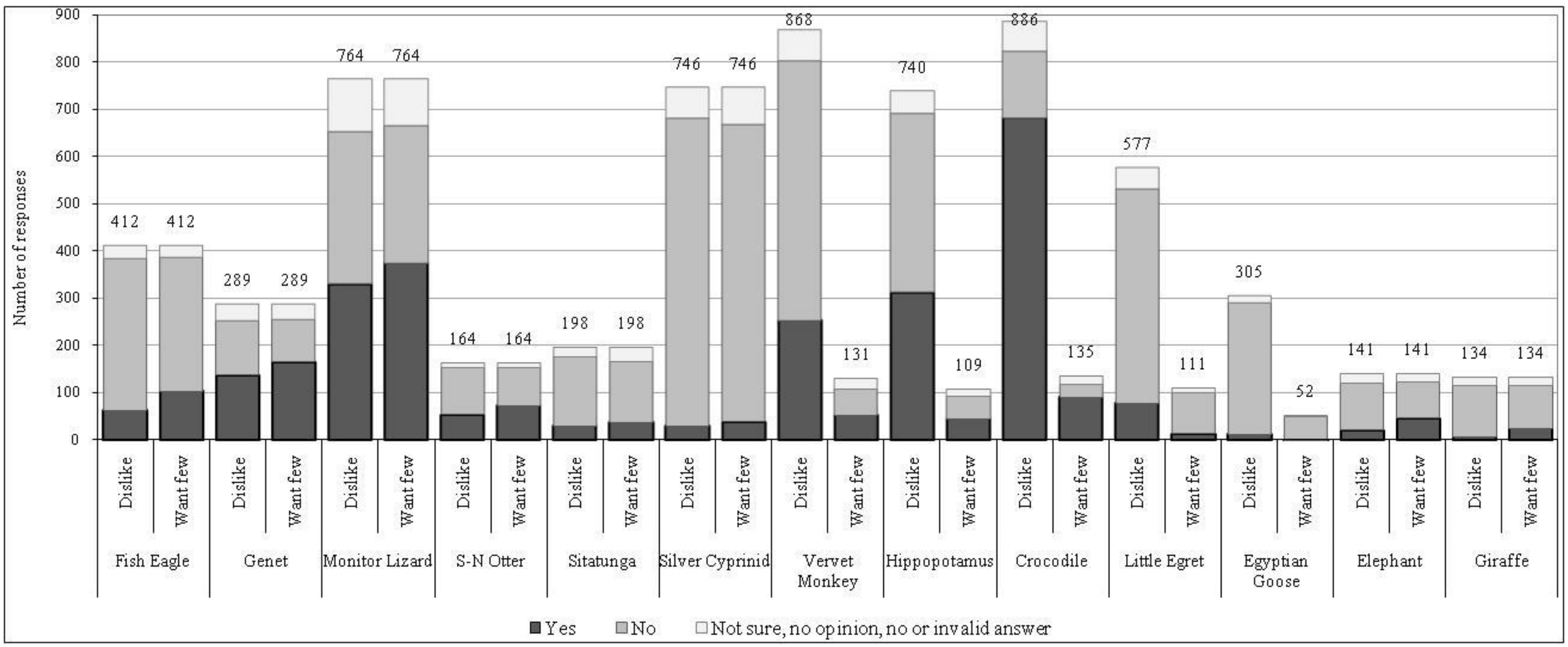
Want "few" of spp.	**Fish Eagle†**	**Genet**	**M. Lizard**	**S-N Otter**	**Sitatunga**	**S. Cyprinid†**	**V. Monkey†**	**Hippo†**	**Elephant†**	**Giraffe†**
	Mod25	Mod5	Mod10b	Mod3	Mod5b	Mod13	Mod2	Mod 23	Mod40b	Mod3
HOH livestock keeper		28.957	0.508				1.743			
		(1969.918)	*(0.323)*				*(1.091)*			
HOH farmer		-0.619**					2.403***			
		(0.278)					*(0.566)*			
HOH fisherman							2.342***			
							(0.784)			
Constant	-2.996***	0.710	0.732*	-1.448**	-1.946***	-2.901***	-2.163***	-0.847**	-0.390**	-1.217***
	(1.025)	*(0.711)*	*(0.394)*	*(0.611)*	*(0.378)*	*(0.459)*	*(0.663)*	*(0.398)*	*(0.195)*	*(0.232)*
LR Chi^2	*9.638****	*34.291****	*69.456****	*25.582****	*6.684***	*3.169**	*28.785****	*4.512***	*7.325***	*6.764*
Log Likelihood	*-33.854*	*-162.334*	*-459.462*	*-98.106*	*-87.869*	*-55.945*	*-65.166*	*-63.952*	*-79.029*	*-56.442*
McFadden's R^2	*0.125*	*0.095*	*0.070*	*0.115*	*0.037*	*0.028*	*0.181*	*0.034*	*0.044*	*0.057*
McKelvey & Zavoina's R^2	*0.294*	*0.901*	*0.115*	*0.207*	*0.547*	*0.064*	*0.298*	*0.058*	*0.125*	*0.904*
Cragg-Uhler's (Nagalkerke's) R^2	*0.197*	*0.162*	*0.124*	*0.196*	*0.057*	*0.036*	*0.294*	*0.061*	*0.077*	*0.087*
Efron's R^2	*0.119*	*0.111*	*0.094*	*0.148*	*0.032*	*0.016*	*0.233*	*0.046*	*0.047*	*0.034*
Adjusted Count R^2	*0.000*	*0.087*	*0.223*	*0.233*	*0.000*	*0.000*	*0.392*	*0.091*	*0.000*	*0.000*
H-L (groups, $\hat{C}$*, p)*	*‡*	*8, 2.77, 0.838*	*9, 2.50, 0.927*	*6, 1.10, 0.895*	*‡*	*‡*	*7, 3.05, 0.693*	*‡*	*‡*	*‡*
n	*66*	*269*	*714*	*161*	*179*	*193*	*116*	*96*	*126*	*119*

*p < 0.10 **p < 0.05 ***p < 0.01 † Model based on 2009 data only ‡ Ties resulted in too few groups for statistic to be reliable

Table 3.7. The results of Pearson's Chi-square tests to determine the effect of gender on "disliking" and wanting "few" of each of the species included in my 2008/2009 survey of school children in communities surrounding Rubondo Island National Park, Tanzania.

	"Dislike"			Want "few"		
Species	χ^2	***p***	***n***	χ^2	***p***	***n***
Fish eagle	2.761	0.097	67	7.869	0.005*	66
Genet	1.831	0.176	58	0.732	0.392	57
Monitor Lizard	0.001	0.970	188	0.158	0.691	191
Spotted-necked Otter	0.548	0.459	44	0.834	0.361	44
Sitatunga	3.622	0.057	72	0.126	0.722	69
Silver Cyprinid	0.479	0.489	190	3.082	0.079	193
Vervet Monkey	6.509	0.011*	213	5.107	0.024*	116
Hippopotamus	0.373	0.541	187	1.161	0.281	96
Crocodile	0.355	0.551	219	0.096	0.757	123
Little Egret	0.735	0.391	165	0.588	0.443	100
Egyptian Goose	0.078	0.780	67	0.028	0.867	50
Elephant	5.800	0.016*	124	3.107	0.078	126
Giraffe	3.453	0.063	116	0.352	0.553	119

Figure 3.1. The number of students that “dislike” and want “few” of each of 13 selected species present in Rubondo Island National Park, Tanzania, based on 2008/2009 survey results (see Chapter 2). Students were asked to identify an illustration of each species prior to being asked a series of questions about the illustration. Only the opinions of students able to correctly identify a species were included in analyses. Nine hundred and thirty-two students were asked to identify every species except the giraffe and elephant, which only 141 students were asked to identify. Each student who was asked to identify an illustration was asked if s/he liked the species. Therefore, the total at the top of each “dislike” column represents the number of students who were able to correctly identify the corresponding species. Only a portion (*n* =141) of participants were asked for their opinions regarding the population sizes for some species.



CHAPTER 4

LOCAL INTEREST IN VISITING RUBONDO ISLAND NATIONAL PARK: IMPLICATIONS FOR CONSERVATION

Abstract

Support from members of local communities can greatly enhance the long-term success of protected areas. However, residents living near many national parks around the world have negative attitudes toward those areas, and even conservation in general. In Tanzania, where negative attitudes toward national parks and conservation have been previously reported, visitation to national parks by citizens is low, although visits to protected areas can increase ecological and conservation knowledge, and increased knowledge has been associated with greater support for protected areas. Rubondo Island National Park (Rubondo), in Lake Victoria, Tanzania, receives limited local support and local residents are reported to have negative attitudes toward conservation and its proponents. I used a survey of 932 school children and interviews with 48 adults to assess past visitation and interest in future visits to the Park. In addition, I analyzed all comments made by adult interviewees that were directly relevant to local visitation of Rubondo. Ninety percent of children and 83% of participating adults had not visited Rubondo, although 92% of children and 98% of adults desired to visit. Most adult participants (71%) also did not know anyone who had visited the Park. Adult participants indicated that lack of information was a major barrier to visitation. Cost also was mentioned as a barrier, although to a lesser extent. Interviewees who showed ambivalence to conservation, wildlife tourism generally, or Rubondo cited not having visited the Park as a reason, as did others whose responses were more negative. In contrast, some participants saw value in protecting wildlife and the places they live or wildlife tourism on Rubondo because of the potential for themselves or their children to visit the Park and/or learn about the environment. Adult participants also associated visiting the Park with opportunities for themselves and others to learn about the environment. The results of

my research suggest a great need for Park management to continue, and increase, efforts to promote local tourism to Rubondo. Several recommendations are made for how local tourism may be encouraged and promoted.

Introduction

Without support from local residents, parks and reserves in many areas of the world can be subject to intense poaching, pilfering, and various forms of damage (Jacoby 2003, Kafarowski 2003, Moorman 2006). In Tanzania, reports of negative attitudes toward conservation and protected areas emerged as early as the conflicted beginnings of the country's first parks in the 1930s (Neumann 1992), likely because for local people the implementation of wildlife conservation policies typically resulted in cultural disruptions and less access to traditionally used natural resources (Neumann 1992, Shibia 2010). Tanzania's National Parks, like the American and South African Parks they were modeled after, did not allow for permanent human settlement or economic activity (Neumann 1992)—a characteristic often not appreciated by those living within or near the boundaries of either American or African Parks (Neumann 1992, Jacoby 2003). Perhaps related to these beginnings and attitudes, domestic tourism to Tanzania's National Parks (and National Parks in East Africa in general—Sindiga 1996, Kassilly 2003) has been consistently low, and the majority of visitors have been international (Ministry of Natural Resources and Tourism 1999, Bonine et al. 2004). In Kenya, Kassilly (2003) reported a common belief that wildlife viewing was only for foreigners and a few wealthy citizens. Tourism has been said to be of little interest to people in other parts of Africa as well, and representative of different, often competing interests (Jones 2006).

Interest in promoting local tourism, however, is on the rise in East Africa (e.g., see Ministry of Natural Resources and Tourism 1999, Tanzania Tourist Board 2009, Toroka 2011) and local negativity toward the area's National Parks may be declining. For example, by the late

1980s, the majority of local people living adjacent to 5 National Parks in Tanzania were opposed to the abolishment of the neighboring Parks, a sentiment that was most common among residents newer to the area (Newmark et al. 1993). In neighboring Kenya, which has a similar history in regard to protected area development, and where negative attitudes toward National Parks were reported as recently as 2010 (Shibia 2010), negative attitudes also were less common among younger residents (Shibia 2010).

Increased local visitation to National Parks may benefit conservation. Researchers in Costa Rica reported that local residents who had visited a nearby protected area had greater ecological knowledge than their neighbors who had not visited (Moorman 2006). Additionally, Moorman (2006) and other researchers (e.g., Fiallo and Jacobson 1995) have reported that people with greater ecological knowledge are more supportive of or see more value in protected areas. Therefore encouraging local tourism to National Parks may be important to the long-term success of conservation in Tanzania.

Sometimes tourists seeking wildlife or nature tourism experiences are already more knowledgeable about and have more positive attitudes toward the subject of their trip than the average public (e.g., for wildlife see Smith et al. 2009). However, many people in Tanzania may want to visit nearby National Parks because of the unique experience, the fame of the areas for international tourism purposes, or simply because other tourism opportunities are limited—not necessarily because of a previous interest in nature or wildlife. Visits to Parks by people not already knowledgeable and positive about conservation provide a unique opportunity for conservation education. Research has shown that education provided during natural area and wildlife tourism experiences can increase knowledge [e.g., about the environment (Tisdell and Wilson 2005) or wildlife (e.g., Smith et al. 2009, Lück 2003)]. In addition, knowledge and experience with a topic can positively influence related attitudes (e.g., in regard to wildlife: Morgan and Gramman 1989, Yore and Boyer 1997, Tomažič 2008). Education provided in conjunction with tourism experiences (e.g., interpretation during tours) also has been reported to impact behavioral intent or actual behaviors. For example, visitors to a National Park in Australia who took part in turtle watching reported an increased desire and intent to engage in behaviors congruent with conservation as a result of the visit (Tisdell and Wilson 2005). Minimal-impact education (i.e., teaching Park visitors to minimize noise, litter and shortcutting) was also reported effective in curbing undesirable behaviors in Australia (Buckley and Littlefair 2007). Facilitating visits by local residents to National Parks where education activities are held or interpretation is available may therefore be an important step toward reaching conservation goals.

Rubondo Island National Park (Rubondo), in the southwest corner of Lake Victoria, Tanzania (Figure 4.1), is one example of a National Park that receives little support from nearby residents (TANAPA 2003). The relationship between the Park and local communities was likely influenced greatly by the eviction of the Island's original inhabitants (Kiwango et al., *in prep*) soon after the Park's inception in 1977 (TANAPA 2003). Those evicted, many of whom relocated to surrounding communities, were put in difficult, sometimes fatal, living situations (Kiwango et al., *in prep*). Although Park-community relations have improved in recent years (W. Mamuya, Rubondo Island National Park, personal communication), tensions between local people and Park management still exist. The prohibition of fishing in the Park's waters is one source of discontent for many in the nearby communities, and poaching of fish is a frequent occurrence (TANAPA 2003). Poaching of other wildlife in the Park also takes place, but to a much lesser extent (TANAPA 2003). As part of efforts to improve Park-community relations and promote positive attitudes toward conservation, the Park employs 2 full-time outreach staff. Park managers also encourage visits by local schools to the Park through cost sharing, and overnight facilities were built for such groups (S. Ndaga, Rubondo Island National Park, personal communication). Unfortunately, outreach activities often are limited by budgetary constraints (largely due to the cost of boat travel from the Park to nearby communities). The ability to subsidize the cost of visits—and, consequently, their regularity—fluctuates with the Park's budget. Additionally, for some schools, paying the required portion of the costs associated with visiting the Island, although small, is too much of a financial burden. To enable increased visitation by school groups, Park outreach staff have been seeking grant funding to increase the frequency and amount of financial aid that can be provided to visiting schools (S. Ndaga and H. Mwamjengwa, Rubondo Island National Park, personal communication).

Visitation to parks is often considered important for building the support necessary to ensure that such places continue to exist (e.g., Bushell et al. 2007). Therefore, in conducting surveys of school children and interviews with adults about perceptions regarding wildlife and conservation, both as part of a larger project intended to inform Park staff in their efforts to build support for the Park, I measured past visitation to Rubondo and interest in visiting in the future among participants. No further questions were asked specifically about local tourism or local visitation to Rubondo in either surveys or interviews. However, adult interviewees were asked about general perceptions of conservation, wildlife tourism, and national parks, and were provided opportunity to comment freely on those topics. Unexpectedly, participants often used that opportunity to make comments relevant to local visitation to Rubondo. This chapter focuses on those reponses, as well as responses to survey and interview questions specifically about local visitation to Rubondo, and how those both relate to wildlife conservation. The connections between local visitation and wildlife conservation presented in this chapter are largely inductive, as I did not set out to test specific hypotheses about the relationship between the 2 topics.

Methods

Study Area

Rubondo Island National Park consists of 236.8 km^2 of dry land, comprised of the main island of Rubondo and 11 smaller islets (TANAPA 2003). The Park also includes 220 km^2 of protected waters that are considered important breeding ground for fish (TANAPA 2003, TANAPA 2008*a*). Many rare tree species and >20 types of orchids occur in the largely-forested interior of the Park. Native animal species confirmed as present in the Park include the sitatunga

(*Tragelaphus speki*), bushbuck (*Tragelaphus scriptus*), vervet monkey (*Cercopithecus pygerythrus*), hippopotamus (*Hippopotamus amphibius*), crocodile (*Crocodylus niloticus*), genet (likely *Genetta genetta*), spotted-necked otter (*Lutra maculicollis*), marsh mongoose (*Atilax paludinosus*), cane rat (*Thryonomyidae* spp.), monitor lizard (*Varanus niloticus*), python (species unlisted), and >200 bird species (TANAPA 2003, G.D. Moshi, Rubondo Island National Park, personal communication). Other native species that have been seen on the Island include clawless otter (*Aonyx capensis*—Kruuk and Goudswaard 1990, J. Reed-Smith, George Mason University, personal communication), forest cobra (*Naja melanoleuca)*, water cobra (presumably *Boulengerina annulata*, although no official reports exist for the species in Lake Victoria—Spawls et al. 2006), and vipers (unknown spp.—G.D. Moshi, Rubondo Island National Park, personal communication). Introduced chimpanzees (*Pan troglodytes*), giraffes (*Giraffa camelopardalis*), "black-and-white colobus" monkeys (*Colobus geureza*), suni antelope (*Nesotragus moschatus*), elephants (*Loxodanta african*a), and grey parrots (*Psittacus e. erithacus*) also are present on the Island. Roan antelope (*Hippotragus equinus*) and black rhinoceros (*Diceros bicornis*) were introduced but are thought to have been extirpated (TANAPA 2003).

Easily-viewed wildlife is just one of Rubondo's visitor attractions. The Park also offers picturesque views of white sand beaches, rocky shores, and papyrus swamps (TANAPA 2003). Additionally, the Park provides opportunities for hiking, which are fairly rare in Tanzanian National Parks. Perhaps of particularly great local importance (especially for those who once lived on Rubondo, or whose ancestors did), the Park includes several cultural and spiritual sites.

Rubondo is managed by Tanzania National Parks Authority (TANAPA). TANAPA is a parastatal organization funded largely by international wildlife tourism (Bonine et al. 2004). Because of the importance of tourism, Rubondo, like other Tanzanian National Parks, contains several types of tourist accommodations, including a privately-owned luxury tented camp, several Park bandas, and a tent site. In addition, the Park's youth hostel (built to accommodate visiting school groups) is available for local visitors. According to the most recent Park brochure, the entrance fee for East Africans >16 years old is < $1 USD per day. For non-East Africans, the fee is $20 USD. Similar fee structures exist for Park-owned accommodations as well, and the cost for staying in the hostel is < $2 USD per visitor/night. Five ranger posts are distributed almost evenly around the Island's shoreline (Figure 4.2), and one is on the mainland in Nkome. The main offices for the Park, the entry point for most visitors, and all permanent accommodations are located near the ranger post midway along the Island's east coast (Kageye). Vehicle travel on the Island is largely confined to one road that crosses from Kageye to Mlaga Ranger Post on the west-central part of the Island and, consequently, the majority of travel around the Island (excluding patrols) is by boat.

Although the villages in the areas surrounding the Park vary in size, the landscape is generally rural. For example, in 2007 on one of the Islands included in my study area (Butwa), there were 2,220 residents, 524 (24%) of whom were under the age of 14 (M. Chiweki, R. Magessa, and C. Billing; Butwa Island; personal communication). Another of the mainland communities (Katemwa) had 1,580 residents in 441 households in 2008 (C. Matonange, Katemwa Village Government, personal communication). Over 75% of households in Tanzania's rural areas are headed by an individual who works in agriculture or fishing (National Bureau of Statistics 2002), and the information available in local communities suggests that this is true in the study area. On Butwa, for example, the adult working population is divided into farmers (260), registered fishermen (200), small-scale businessmen (31), livestock keepers (47), and traditional healers/"witch doctors" (3) (M. Chiweki, R. Magessa, and C. Billing; Butwa Island; personal communication—June 2007). Over 39% of the population in Tanzania's rural areas falls below the basic needs poverty line (National Bureau of Statistics 2002).

Study Design

Surveys of school children were completed in 7 communities surrounding Rubondo Island National Park: Butwa, Ikuza, Izumacheli, Maisome, Muganza, Katemwa, and Nkome (Figure 4.3); all are between 5.5 km and 20.7 km from the nearest point of the Park. The survey instrument (Appendix B) largely assessed local children's perceptions of species occurring on Rubondo, as well as the children's general wildlife preferences (see Chapter 2 for more detail). However, the survey also included 2 questions regarding visitation to Rubondo (Table 4.1). Demographic variables measured by the survey included standard (grade), school, tribe/ethnic group (of which there are >130 in Tanzania—Ndembwike 2006), and profession of the head of the students' household (HOH). A subsample of students also was asked for their gender. Surveys were administered in classrooms by myself, other project team members, and a Park staff member, with assistance from teachers in some cases.

In-depth interviews with adult community members also were conducted in the mainland villages of Katemwa and Nkome by a project team member (who was Tanzanian, although from a different region) using a combination of nonprobability sampling techniques (Henry 1998). In Katemwa, a temporary employee of the village suggested prospective participants based on my request for people of varying gender, age, and profession, and introduced the interviewer to each. In Nkome, the interviewer was given a letter from the local governmental office providing permission for the research, but selected, approached, and interviewed participants alone, showing the letter to each potential participant when introducing herself. The interviewer asked people she encountered throughout Nkome village to participate in interviews, again trying to include participants from a diversity of backgrounds. No Park personnel or other researchers were present during any of the interviews.

Interviews were semi-structured, and generally lasted about 1 hour. The interviewer did not collect the names of participants, but did ask for and record each participant's age, gender, profession, and village of residence. Questions included in the adult interview protocol (Appendix E) were similar to those in the children's survey, largely focusing on perceptions of animal species, and also including questions about whether participants had ever visited or were interested in visiting Rubondo (Table 4.1). Additional open-ended questions also were asked regarding respondent's perceptions of Rubondo, wildlife conservation, and tourism. "Local" tourism was not mentioned specifically in interviews, with the exception of early questions about the participants' own visitation to Rubondo. However, those initial questions may have primed some participants to put subsequent questions in a local context.

Both surveys and interviews were conducted in Swahili. Responses to open-ended survey questions were translated into English prior to analyses, but interviewee responses were translated directly into English by the interviewer. Initial surveys were captured with a digital voice recorder, but those recordings were lost when the recorder was stolen and subsequent interviews were not recorded. Therefore, quotes included here are based solely on the interviewer's notes.

Data Analysis

Descriptive statistics were calculated for demographic questions and for those regarding visitation to Rubondo using Stata/IC 11.0 (StataCorp, College Station, Texas 77845, USA). Initially, all interview questions that resulted in a response relative to (1) the participant themselves or (2) others in the community visiting the Park, or (3) local tourism generally were isolated. As repetitive elements related to local tourism were identified within those responses, themes were developed, and responses were thematically coded. Throughout the process, all responses were continually re-assessed for relevance to, and support and opposition of, the developing theme.

Results

Students at public schools in 7 communities surrounding Rubondo Island National Park participated in surveys between May 27, 2008, and February 16, 2009. The majority of participants were in Standard 6 (n = 523) and 7 (n = 393), although 16 students from Standards 4 and 5 also completed surveys. Overall, between 21% and 92% of the students enrolled in Standards 6 and 7 in each school participated. In most schools, not all classes in each grade were invited to take part in the survey due to space and staff limitations. However, in all but 1 school, where 8 students declined to participate at their parents' request, all children in participating classes who were present at school completed surveys. Forty-eight adults participated in interviews in August, 2008; 30 were from the Katemwa area and 18 from Nkome area (although all interviews were conducted in those 2 villages, some participants approached resided in nearby areas). The few adults that declined to participate in interviews cited only the length of the interview as the reason. In addition, 8 of the 48 people who did participate did not finish the interview. All 8 did, however, complete the section on visitation to Rubondo. Responses relevant to local tourism were obtained for 15 separate adult interview questions beyond those specific to visitation of Rubondo (Table 4.2).

Both adult participants and the students' HOHs were commonly involved in >1 profession. Farming was the most common profession for students' HOHs and adult participants (553 HOHs, 34 adult participants) (Figure 4.4). Participants and their families were also involved in (from most to least common) business (227 HOHs, 18 adults), fishing (109 HOHs, 9 adults), and livestock keeping (61 HOHs, 6 adults). Sixty-eight HOHs and 10 adults were involved with other professions, including teaching, short-term jobs (piece work), employment in the local government, home making, and various others. Students listed at least 31 different confirmed tribal affiliations, and possibly as many as 41 (although the additional 11 could not be confirmed) (Figure 4.5a). Adult participants identified themselves as belonging to 11 different tribes (Figure 4.5b). Among the 246 student participants asked for their gender, 119 were female, 121 were male, and 6 were invalid or nonresponses. Males and females were equally represented in the sample of adult interviewees.

Interest and Past Visitation

The majority of participants (83% of adults and 90% of children) had not visited Rubondo Island National Park (Figure 4.6). Twelve of the adult participants responded, "not yet" when asked if they had visited, possibly suggesting a desire or intention to visit the Park in the future. When specifically asked if they would like to visit, nearly all (98% of adult participants and 95% of responding children) answered affirmatively (Figure 4.6). One participant, a farmer from the Nkome area who also does piece work, added "… I would love to so much." Of the 8 adults that had visited Rubondo, 1 noted that her visit was "a long ago time ago, about when I was 16 years old" (approximately 24 years earlier). Two participants that had previously been to Rubondo also immediately added that they would like to visit again.

All adult participants wanted their children to be able to visit Rubondo. Several people associated that desire with opportunities for children to learn about wildlife and the environment. For example, a male agriculturalist and fisherman in his 60s from Katemwa area noted, "I would like them to be able [to visit] because they'll be able to see the animals they have never seen before." A male agriculturalist and village employee in his 40s from Katemwa area said he "would love children to be able to go [to Rubondo Island National Park] so that they learn." Lastly, a male farmer and piece worker in his 40s from Nkome area noted that he would like his children to be able to visit "so that they understand the environment surrounding them." Most adult participants (71%) did not know anyone who had visited Rubondo. Among those who provided details regarding the individuals they knew who had visited, all but 1 of the described visitors (who got married on the Island) went with organized school or religious groups or worked on the Island.

Barriers to Visitation

During the course of adult interviews, several of the topics that participants hinted at when asked about visitation to the Island were further elucidated. For example, the indication by 1 participant that she would like to visit Rubondo if she gets an opportunity illustrates a theme that became common throughout interviews. Participants made clear that barriers, generally in the form of information and cost, impeded their ability to visit the Park. Thirteen different adult participants mentioned lack of information about how to visit the Park, nearly always in conjunction with an expressed desire for the information. This sentiment was captured by a male in his 30s involved in agriculture who emphasized: "Procedures should be put openly, by the

Park, so that the citizens understand how to get there. People are very old and don't even know how to get there." Three of the participants who mentioned a lack of information about how to visit as well as a desire for that information also expressed fear of being shot for trying to enter the Park without knowing the proper procedures. A male agriculturalist and fisherman in his 60s from Katemwa said, "Local people do not understand how to get there as local tourists but fear they may be shot dead." A businessman in his 30s from Katemwa also stated, "They should let people know openly that the Park can be visited by local people because we are scared that we'll be shot to death." Another male in his 50s from Muganza area involved in agriculture noted, "They should put an office for easy communication with the Park, rather than people going to see people far away with the canoes and end up being shot."

This desire for a Park office in Muganza was echoed by another participant, a male in his 30s from Nyabugera involved in agriculture, business, and fishing, who said, "The Park should make offices at Muganza, so that people can get the information about the Park and how to get there." Generally, however, participants were not specific about how information about visitation should be transmitted. Comments were often general appeals, such as those of a male in his late teens from Nkome working in well-respected profession, who said "People who work there [at Rubondo] should be able to educate the local people about the Park, so that they visit it, as procedures of visiting the Park are not known." Another male in his 30s from Nkome involved in fishing and sports emphasized a desire for priority to be placed on local visitation, saying: "People at Nkome would love to visit the Park but they don't know how the procedures and people who know the procedure are tourists only…. Through wildlife tourism, the Park should have given the first priority to the people of Nkome." This perceived lack of information likely also accounts for the majority of participants having no response or indicating that they did not know when asked generally for their opinions about wildlife tourism on Rubondo. As one individual, a female in her 20s from Muganza involved in agriculture and business, explained, "People do not know much about the tourism there, especially local tourism." It should, however, be noted that 1 teacher from Nkome did say that “the Park holds seminars to encourage the community to visit the Park,” although no other participants mentioned this form of outreach.

Costs were mentioned by 5 adults as a barrier to visitation, and implicated by another as something with which help was needed. For some people those cost barriers were associated with reaching the Island, and for others with Park entry fees. For example, a male in his 60s from Muganza area working in agriculture and fishing noted the following when asked how wildlife tourism benefitted him: “TANAPA should minimize the cost of entry fees so that we local people can visit the Park.” A female agriculturalist in her 30s from Nkome, when asked if she would like to visit, replied “Yes, but we have no money to get there.”

Visitation and Support for the Park, Conservation, and Tourism

Twenty-six interviewees specifically stated that they were uncertain or lacked knowledge regarding the topics of conservation and/or wildlife tourism. References participants made to not having visited the Park have added importance when explaining their opinions (or lack thereof) on tourism, conservation, and Rubondo. Seven people who showed ambivalence toward conservation, wildlife tourism generally, or Rubondo cited having never been to the Park as the reason. A male in his 40s from Katemwa area involved in farming and local governance remarked, “We haven't seen any importance [of wildlife tourism in Tanzania]; we haven't had a chance to see the Parks and how important they are.” A male in his 30s involved in agriculture evoked a similar sentiment when asked how protecting wildlife and the places they live benefits him, stating “I personally don't know about how it benefits me, as I've never visited the Parks.” A female in her 30s from Nkome area involved in agriculture also related not having visited the Park to uncertainty about increased tourism on Rubondo when she noted, “[I’m] not sure [if I would like there to be more tourism on Rubondo], because I have never been to the Park.” Another 4 people conveyed more negative feelings toward the Park, conservation, or tourism because of having never been to Rubondo. For example, a male in his 20s living in Nyabugera and involved in agriculture and fishing said, “Wildlife tourism has affected me negatively because I've never seen the wildlife at Rubondo National Park.” A female professional in her 40s from Katemwa similarly maintained, “For now I haven't benefited [from the protection of wildlife and the places they live] because I have never visited the Park.”

In contrast to some of the negative and ambivalent impressions mentioned above, 9 of the adults interviewed saw value in protecting wildlife and the places they live or wildlife tourism on Rubondo because of the potential for themselves or their children to visit the Park and/or to learn about the environment. A male from Nyabugera in his 30s involved in agriculture, fishing, and business stated, “Yes [wildlife tourism is important in or near this community], because our open areas do not have wildlife and it will be great if our children will have the Parks to see different wildlife.” The female professional from Katemwa quoted previously who said she had not benefited from the protection of wildlife and the places they live because she had never visited the Park also noted that wildlife tourism on Rubondo benefits her “by going to see wildlife.” A female agriculturalist from Nkome stated, “Yes [protecting wildlife and the places they live is important to me] because students will get an opportunity to learn about it when they visit the parks.” A similar sentiment also was shared by the male from Nkome in his late teens who noted when asked if protecting wildlife and the places they live benefits or harms him “No harm, but has benefits, have seen animals—wildlife at Rubondo National Park, the beautiful environment. I've seen the animals I never knew.”

Lastly, several people hold or alluded to local misconceptions regarding what happens at the Park. These misconceptions appear to apply to both researchers and tourists. A male from Nyabugera in his 30s involved in fishing, farming, and business maintained, “[When people come to Rubondo or Tanzania to study wildlife] they come to view wildlife, but the community, some say they come to get minerals that were hidden during the colonial era.” In Katemwa, a businessman in his 30s asked for his opinion of wildlife tourism, replied “I hear that when tourists go to the parks they go there to get some minerals and see wildlife.”

Visitation and Learning

The association of visiting the Park with learning was common throughout interviews, and not only associated with the positive feelings toward wildlife and conservation or desire for children to visit the Park, as mentioned above. For example, a male in his 30s from Muganza area working in agriculture and fishing also tied visiting Rubondo to learning when, in response to being asked if wildlife tourism is important in Tanzania, he replied, "We learn a lot when we visit the Park and we learn about the benefits." He later added, "The prices of entering the Park are high for the community … so they don't learn about wildlife." Another, a professional in his 20s from Nkome, noted, when asked if he would like to visit Rubondo, "I always want to visit the Park so that I see the animals and answer the questions I always ask myself."

Discussion

Interest and Past Visitation

Most participants (90% of children and 83% of adults) had not visited Rubondo, and most adults (71%) did not know anyone who had visited either. However, nearly all participants reported a desire to visit the Park. I also saw this eagerness to visit the Park among local adults that I hired to assist with another aspect of my larger project. In addition, all adults wanted their children to have an opportunity to visit Rubondo, and many mentioned the learning opportunities such a visit presents. The high levels of interest in visiting Rubondo among local people may be related in part to the uniqueness of the mainly-forested Park in relation to the more open environment around nearby communities, as well as the more diverse assemblage of wildlife present in the Park. In addition, because Rubondo (unlike most protected areas) cannot be readily seen from nearby areas, residents of neighboring communities may have elevated levels of curiosity about the Park.

Barriers to Visitation

Although the overwhelming majority of participants (92% of children and 98% of adults) desired to visit Rubondo, many factors beyond interest, including time and money, influence people's destination decisions (Pearce 2005). Cost, in particular, can have a negative influence on Park visitation (e.g., Schwartz and Lin 2006). Five adult participants considered cost a barrier to visiting Rubondo. Cost also was cited by Kenyans living around Lake Nakuru National Park as a reason for not having visited (Kassily 2003). However, my interview protocol did not include questions regarding knowledge of Park entry fees, nor did it specifically explore satisfaction with pricing. I did see anecdotal evidence that the lack of information regarding Park procedures extends to the fee structure for Park entry. For example, after administration of surveys to students at Izumacheli Primary School one student asked why *mzungus* (white people, and in this case more specifically white tourists) could enter the Park for free, but he (i.e., local people) had to pay. Although these data clearly are not a complete and accurate representation of the level of concern or contentment with pricing of the Park, they do illustrate a need for additional research regarding local awareness of Park entry fees and their affordability, and, at a minimum, better distribution of pricing information. Based on the results obtained here, lack of information seems to be a more immediate barrier to visitation than existing entry fees. However, several people also did mention getting to the Island as a problem, and most local people likely have an idea of the cost of such transportation. Therefore, additional attention should likely be given to transportation issues.

Park management has not been insensitive to many of the cost and transportation issues brought up by local people during interviews. Because Rubondo is an Island, visitors face somewhat unique transportation challenges in reaching the Park. Rubondo's management has addressed some transportation issues by allowing local visitors to enter the Park through any ranger post. Park management's flexibility has greatly minimized necessary travel distances from most locations. For example, distance from Butwa to the Park Headquarters is approximately 28.2

km. However, if able to enter through the nearest ranger post, the distance the local visitor must travel decreases to approximately 6.8 km. Similarly, the distance that would need to be traveled from Izumacheli decreases from 26.5 km to 5.5 km. Additionally, the Park allows local people to enter for free with a letter from local government. My results, however, suggest that both fee waiver and entry point information need to be better communicated. Although 1 individual was aware of outreach activities around Rubondo, the vast majority of adult interviewees were not. A similar lack of awareness about Park programs was reported around Marasbit National Reserve in Kenya (Shibia 2010).

Visitation and Support for the Park, Conservation, and Tourism

The lack of knowledge about Rubondo among local people and the paucity of local visitation to the Park apparently contribute to ambivalence or negativity toward the Park, tourism, and conservation. By enabling visitation and, consequently, opportunities to learn about wildlife and the environment, Park management may have an opportunity to greatly increase support and proponents for both Rubondo and conservation efforts more generally. Local people around Rubondo clearly have some level of distrust for Park employees, given several participants' concerns that they would be shot for trying to visit using incorrect procedures. (This sentiment probably results from park rangers carrying firearms, which are feared and very uncommon in the area—S. Ndaga, Rubondo Island National Park, personal communication.) Distrust can negatively influence local support for parks (Stern 2004, 2008). By making local visitation more common, Park management would have opportunity to allay the fears mentioned above, as well as misperceptions about tourism, which potentially may help to create distrust.

In addition, by increasing local visitation to the Park, management may be able to increase and diversify the types of benefit local people perceive themselves accruing from the Park. Although Rubondo does have an outreach program designed to support community initiated activities, such as the building of schools and dispensaries, and these were recognized and often appreciated by interviewees, Rubondo, tourism, and conservation were also often not perceived as providing any personal benefits to participants. Having the opportunity to enjoying the Park would certainly be a personal benefit.

Visitation and Learning

Lück (2003) reported that wildlife viewing tourists in New Zealand generally enjoyed learning about wildlife during their holiday and considered learning new things an important component for holidays generally. Similarly, adult participants in my study commonly associated visiting Rubondo with opportunities for either their own or others' (typically children's) learning. Providing opportunities for children living around Rubondo to learn about wildlife may be particularly important, given that the children's familiarity with many wildlife species is quite low (Chapter 2). Many animals are easily viewed in the Park, including a sitatunga population that has been called "internationally important" (IUCN 1990). The wetlands inhabited by the sitatunga (Games 1983) are limited near the villages my research was conducted in, and therefore local people likely have little, if any, opportunity to see the species outside of Rubondo. Visiting the Park would allow local people an opportunity to view sitatunga and learn more about the species' dependence (Games 1983) on environmentally critical and increasingly threatened wetland habitats (Kassenga 1997, Kiwango and Wolanski 2008).

Conclusions and Recommendations

Participants generally had not visited Rubondo, but wanted to visit. Adult participants perceived barriers to visitation, primarily the lack of information regarding the procedures for visiting. Several were fearful of dire consequences of trying to visit without fully knowing the proper procedures. Not having visited and lack of knowledge regarding the Park were associated with ambivalence or even negative attitudes toward Rubondo, conservation, or wildlife tourism. Some participants also held, or suggested that others held, misperceptions about what happens when people visit Parks. These results suggest that providing opportunities for local tourism is likely to be an important mechanism for building trust, improving ecological knowledge, and raising support for conservation and Tanzania's National Parks. The following suggestions may assist managers of Rubondo in providing that opportunity and may also be useful to managers of other protected areas in similar situations.

1. Information should continuously be distributed to the communities surrounding the Park regarding procedures for visiting. The information should be provided through multiple avenues, including written materials and presentations, and, specifically for Rubondo, should make clear that local people (unlike international visitors) are able to access the Park through the nearest ranger station and even for free with appropriate documentation from local officials. Information about the availability and cost of overnight accommodations should also be shared, as for some visitors without motorized transport the distance to the Park may be too great for travel in 1 day. To allay fears about the unknown among potential visitors, the information provided should be very clear about what visitors can expect upon reaching the Island—perhaps in part by including images of previous local visitors experiencing the Park. Although not mentioned by participants in my interviews, wildland environments often elicit fear among people unused to such areas (see Bixler 1997), and that fear may result in trepidation about visiting Rubondo among local people.
2. Because interactions with Park staff also are critical for building trust, support, and positive attitudes toward Parks (Newmark et al. 1993; Holmes 2003; Stern 2004, 2008), other more informal methods of outreach (e.g., conversations with individual community members and presence at community gatherings) also are important—not only for information distribution, but for developing a sense of security regarding visiting the Park among local people.
3. Additionally, because some participants in my study feared dire consequences for not following the right procedures for Park entry (e.g., being "shot dead"), Rubondo might

be wise to establish and highly advertise a free visit day each year for local people similar to those provided in other areas (e.g., the United States: National Park Service 2001, Associated Press 2009, National Park Service 2010, Ng 2010; and Costa Rica: Moorman 2006). Because Rubondo is an island, visitors not only face a very real barrier to visitation in the form of a required water crossing, but likely a psychological barrier as well; crossing the span of open water to reach the Park may be particularly intimidating for those who have not visited before. First-time visitors may feel most comfortable making the first trip on a highly advertised free day. If the Park does institute a free visit day, managers should also consider providing discounts on accommodation during those times, or opening the youth hostels for a minimal fee to local individuals and families who have made advance arrangements.

4. Another important step in increasing local people's comfort with making the trip to visit the Park may be to improve signage at entry points to the Park. Because local people are allowed to enter through any ranger post, Park management may want to consider outfitting the landing area for each post with welcoming signage clearly visible from outside of the Park boundaries. In addition, Park management should consider adding bouys and floating signs demarcating "entry lanes" that start at the edge of the protected waters of the Park and continue to each ranger post landing. Such lanes would provide local visitors a "safe" entry point to landings where rangers or other Park staff can be found, and minimize fears of being mistaken for poachers.
5. Barriers in the form of transportation costs should not be ignored. In the case of Rubondo, managers should work within local communities to establish and advertise a network of boat owners willing and able to provide locally-affordable transportation to the Island.
6. Finally, to ensure that future generations will feel comfortable visiting the Park, Rubondo's management team should continue to seek grant funding for bringing

school children to the Island, and consider setting up a fund that international visitors can contribute to for the same purpose. Park management may also be wise to consider organizing visits for groups of adults as well.

The most effective way to alleviate fears and encourage Park visitation may be through word of mouth, and that requires getting visits to the Park by local people started. Therefore, facilitating visits by local residents, even on a small scale, should be an immediate priority for Park management. As the effectiveness of various activities and programs for increasing local visitation becomes apparent, the process can then be further developed, refined, and integrated into the Parks management plan.

Table 4.1. Questions specific to visitation of Rubondo Island National Park, Tanzania that were included in 2008/2009 surveys of school children and interviews with adults, both of which were conducted in communities surrounding the Park.

Questions
Children's Survey (closed-ended)
• Have you been to Rubondo Island National Park? (Options: yes, no, not sure) • If not, would you like to go? (Options: yes, no, maybe)
Adult Interviews (open-ended)
• Have you ever visited Rubondo? • Would you like to visit Rubondo? • Would you like your children to be able to visit Rubondo? • Do you know anyone that has been to Rubondo?

Table 4.2. Open-ended questions asked in 2008 interviews with adults living around Rubondo Island National Park, Tanzania for which responses relevant to local tourism were obtained.

Open-ended Interview Questions
Rubondo General
• What do you think about Rubondo Island National Park?
Protection of Wildlife
• Is protecting wildlife and the places they live important to you? Why or why not?
• Does protecting wildlife and the places they live benefit you or harm you?
Wildlife Tourism
• What do you think about wildlife tourism?
• Do you think wildlife tourism is important in Tanzania?
• Do you think wildlife tourism is important in or near your community?
• How does wildlife tourism affect you?
• What do you think about wildlife tourism on Rubondo?
• How does wildlife tourism on Rubondo benefit you?
• How does wildlife tourism on Rubondo harm you?
• Would you like for there to be more tourism on Rubondo?
Wildlife Research
• What are some things you think are important for people who are working with wildlife in National Parks in Tanzania to understand about you or how wildlife affects you?
• Many people come to Tanzania—and some to Rubondo, which is very close to you—to study wildlife. Do you know much about what these people do and learn?
General Invitations for Additional Comment
• Is there anything else you would like to share with me about anything I talked about?
• What about more general things like wildlife, the environment, or what it is like to live near a National Park like Rubondo?

Figure 4.1. The location of Rubondo Island National Park, Tanzania.

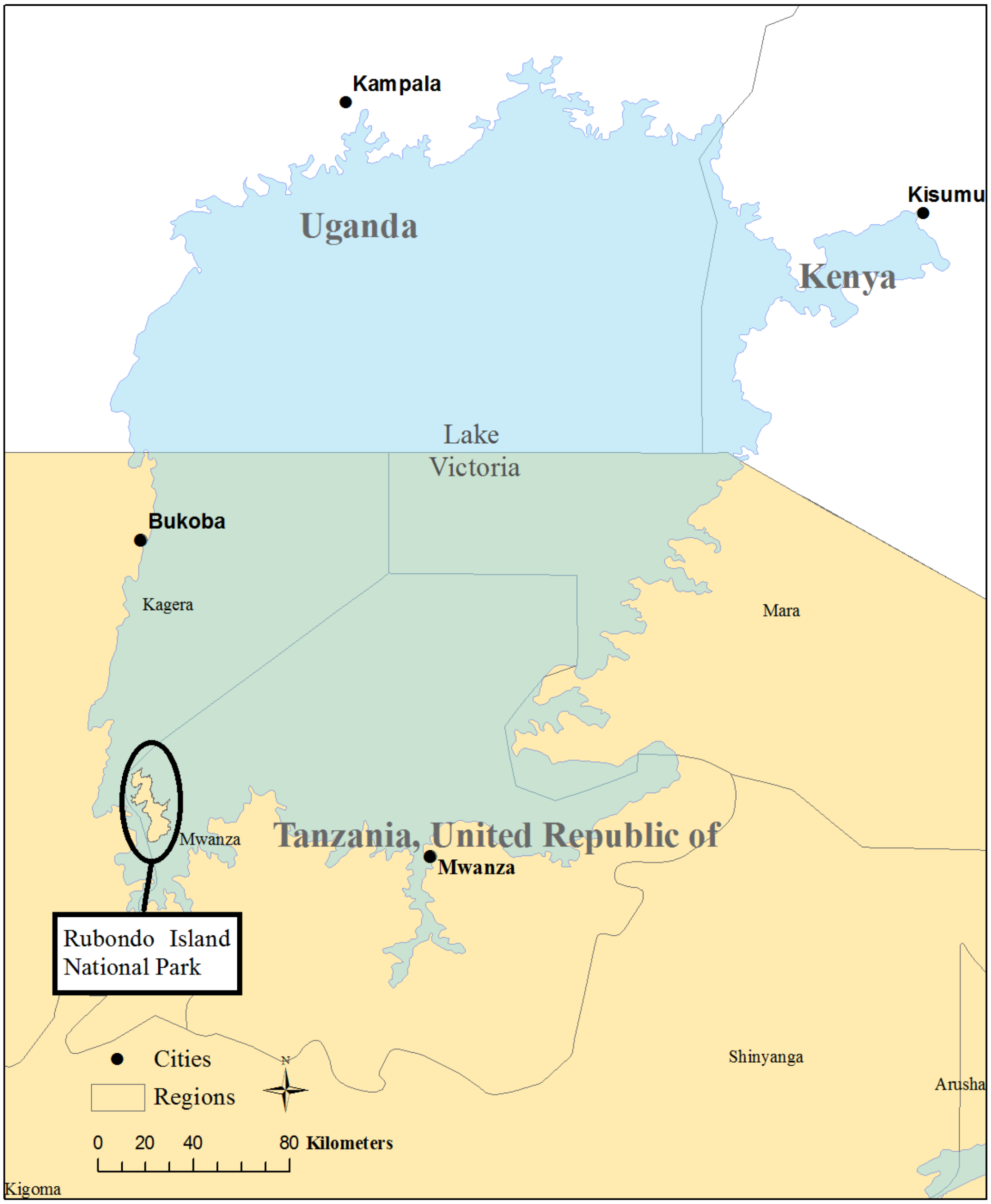


Figure 4.2. The location of the ranger posts on Rubondo Island National Park, Tanzania (with the exception of Nkome, which is located on the mainland).

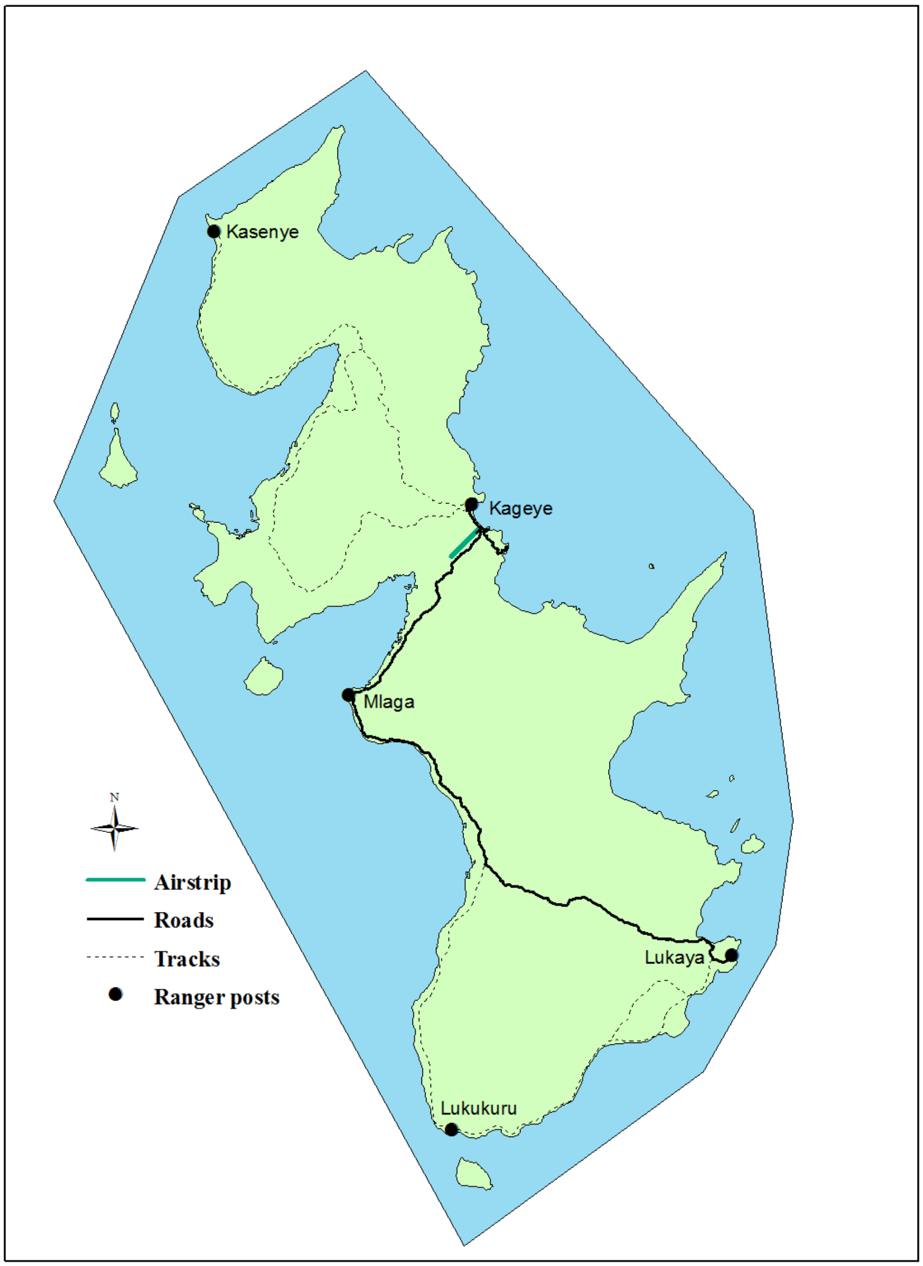


Figure 4.3. Rubondo Island National Park and the surrounding communities in Tanzania where surveys of school children and interviews with adults were conducted in 2008/2009.

Figure 4.4. The professions of the heads of household (HOHs) of responding children who participated in 2008/2009 survey in communities surrounding Rubondo Island National Park, Tanzania (n = 922), as well as the professions of adults who participated in 2008 interviews (n = 48).

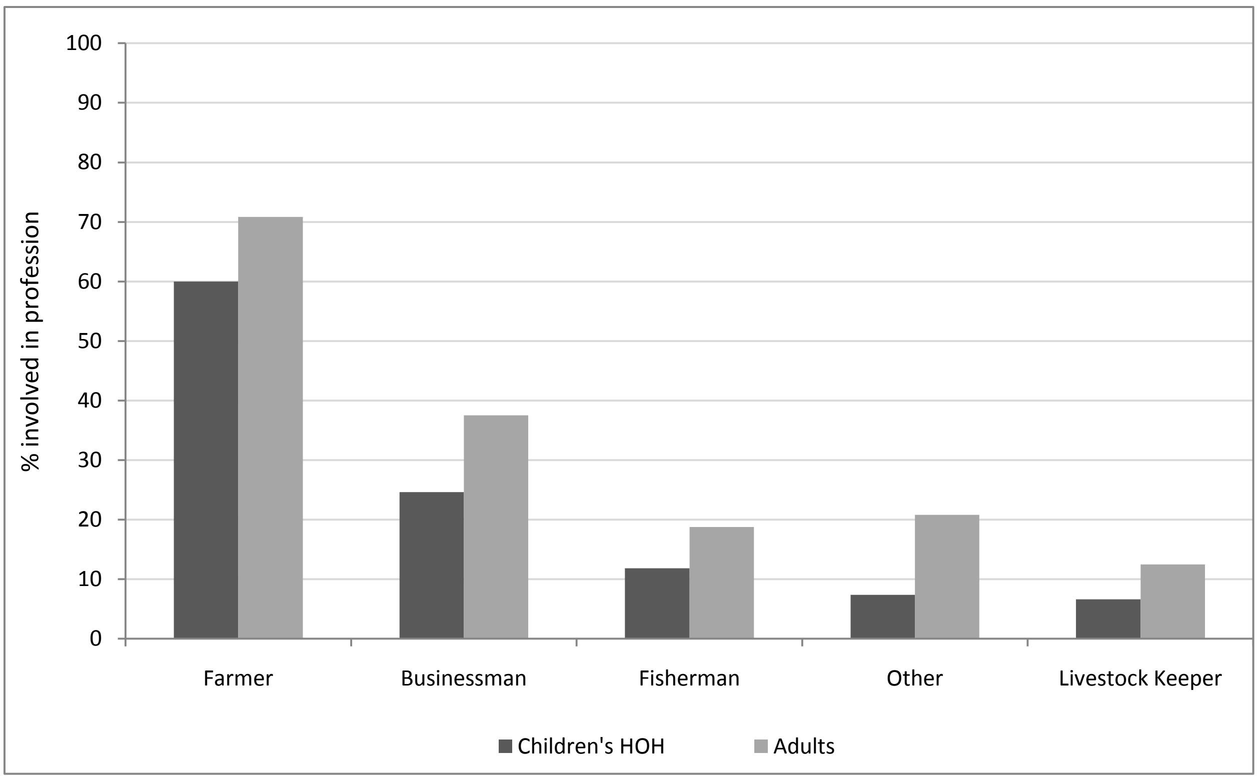
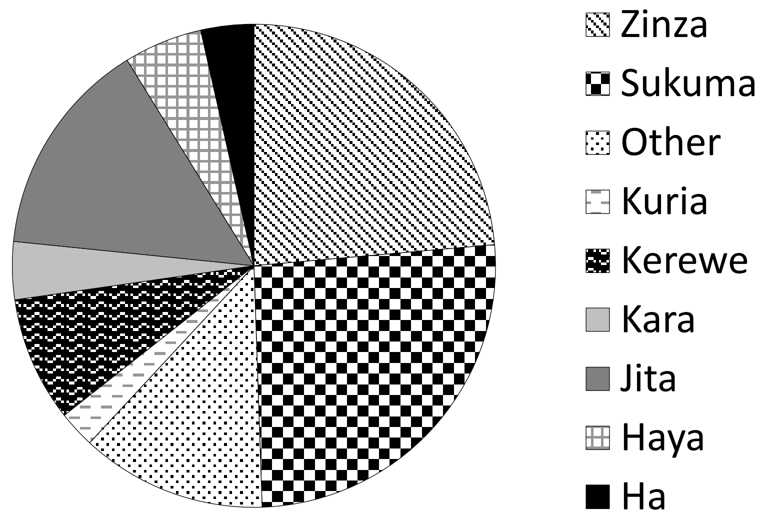


Figure 4.5. The proportion of representatives from different tribes in the sample of responding children (a, n = 917) and adults (b, n = 48) that participated in 2008/2009 surveys/interviews. Only the names of tribes to which ≥20 children or ≥2 adults belong are listed separately; the remaining responses are grouped under the category "Other."

a. Tribes of Participating Children



b. Tribes of Participating Adults

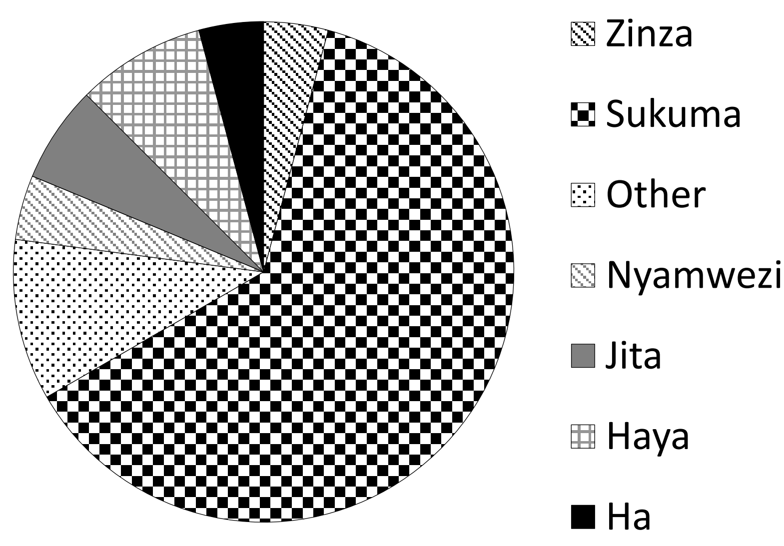
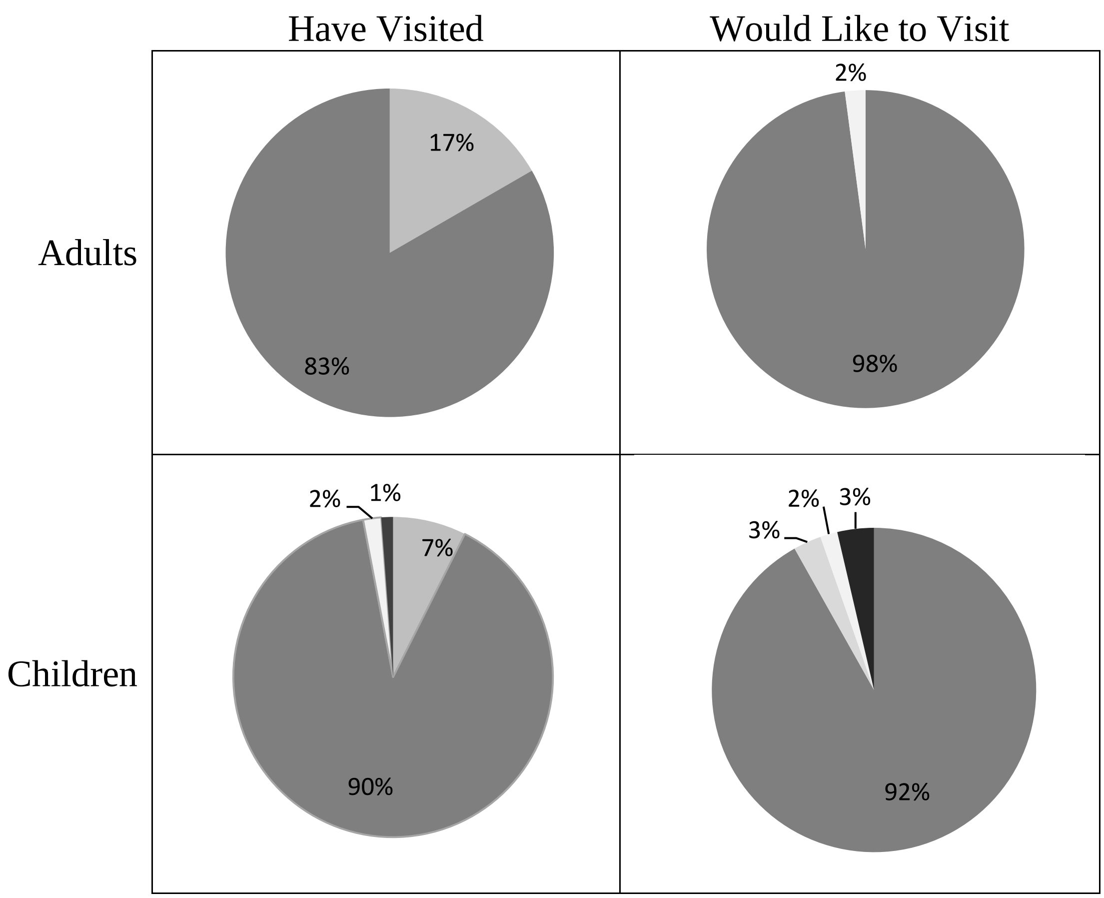


Figure 4.6. The percentage (%) of 932 children and 48 adults participating in 2008/2009 surveys and interviews in communities near Rubondo Island National Park, Tanzania, that have visited and would like to visit the Park. Children were only asked to respond to the question regarding desire to visit Rubondo if they had not previously been to the Park, although generally participants responded to the question regardless of previous visitation.



CHAPTER 5

THE WILDLIFE VIEWING PREFERENCES OF VISITORS TO TANZANIA

Abstract

Wildlife viewing tourism is of substantial economic importance to Tanzania, and a major source of revenue for the country's National Parks. However, little is known about visitors' interest in viewing many of the country's wildlife species. In an attempt to learn more about the wildlife viewing interests of international visitors to Tanzania, I assessed the awareness of and interest in viewing 20 wildlife species (Cape buffalo [*Syncerus caffer*], chimpanzee [*Pan troglodytes*], crocodile [*Crocodylus niloticus*], elephant [*Loxodanta africana*], giraffe [*Giraffa camelopardalis*], hippopotamus [*Hippopotamus amphibius*], leopard [*Panthera pardus*], lion [*Panthera leo*], white rhinoceros [*Ceratotherum simum*], vervet monkey [*Cercopithecus pygerythrus*], bushbuck [*Tragelaphus scriptus*], fish eagle [*Haliaeetus vocifer*], large-spotted genet [*Genetta tigrina*], goliath heron [*Ardea goliath*], black-backed jackal [*Canis mesomelas*], banded mongoose [*Mungos mungo*], monitor lizard [*Varanus niloticus*], serval [*Felis serval*], sitatunga [*Tragelaphus speki*], and spotted-necked otter [*Lutra maculicollis*]) among travelers at Kilimanjaro International Airport. I also compared the wildlife viewing preferences of various demographic and interest groups within the sample of participants. The species the lowest percentage of participants had "heard of" were the: sitatunga (known to 47.3% of participants), genet (37.0%), spotted-necked otter (33.6%), serval (29.5%), and goliath heron (26.0%). Participants indicated a fairly high level of interest in seeing all species included in the survey; none were of viewing interest to <50% of participants. Over 75% of participants were "interested" or "very interested" in seeing the leopard, lion, giraffe, elephant, hippopotamus, rhinoceros, chimpanzee, jackal, buffalo, crocodile, and serval. The lion and leopard tied as the species the greatest percentage of participants were "very interested" in seeing. Participants who were residents of African countries were less interested in viewing most species. All "well-

known" species (leopard, lion, giraffe, elephant, hippopotamus, rhinoceros, chimpanzee, jackal, buffalo, and crocodile) were considered "interesting" or "very interesting" to greater proportions of participants than species considered "little-known." Results have implications for the marketing of protected area tourism and are applied to the little-visited Rubondo Island National Park as a case study.

Introduction

The wildlife tourism industry is of substantial economic importance in many areas of the world, from small, rural towns to entire countries (e.g., Tisdell and Wilson 2004, Smith et al. 2006). Tourism is an important revenue earner for Tanzania (Kweka et al. 2003), and wildlife viewing tourism in particular is a major revenue earner for the country's National Parks (Bonine et al. 2004). Tanzania contains 15 National Parks managed by the parastatal Tanzania National Parks Authority (TANAPA) (TANAPA 2011*b*). Some of those Parks are very famous and highly visited (e.g., Serengeti National Park). Others, however, like Rubondo Island National Park (Rubondo) in the southwest corner of Lake Victoria, have low numbers of visitors, which leads to insufficient funding for important activities such as poaching patrols (S. Ndaga, Rubondo Island National Park, personal communication). Although wildlife tourism potentially could have various negative effects on an ecosystem or particular species (Prescott-Allen and Prescott-Allen 1996, Newsome et al. 2005) and its ability to offset the cost sometimes associated with living near wildlife (e.g., loss of crops) has been criticized (Walpole and Thouless 2005), wildlife tourism also is thought to benefit conservation in various ways. The benefits of wildlife tourism to conservation include direct participation by tour operators or tourists in conservation activities (e.g., removing invasive plants), lobbying for the conservation of natural resources by tour operators, deterring wildlife disturbance through the maintenance of a continuous presence in an area (e.g., people hunting illegally are likely to avoid areas frequented by tourists and tour operators), and the development of tourists into advocates and donors for wildlife conservation

(Higginbottom et al. 2001, Moscardo et al. 2001, Lilieholm and Romney 2002, Higginbottom and Tribe 2004, Valentine and Birtles 2004). In Mauritius, for example, wildlife tourism led to greater recognition by government officials of the importance of wildlife and the subsequent creation of the National Parks and Conservation Service (Lilieholm and Romney 2002), and in several communities in Belize, tourism was cited by local people as the primary reason for support of protected areas (Lindberg and Enriquez 1994).

Africa's National Parks were largely developed for wildlife-based tourism (Lilieholm and Romney 2002), and wildlife viewing is of primary interest and importance to visitors to the Continent's protected areas (Goodwin and Leader-Williams 2000, Okello 2005, Mladenov et al. 2007). Consequently, marketing materials for protected areas in Africa generally include information about the wildlife viewing experiences available. Generally, marketers have focused on the "big 5" (African elephant [*Loxodanta africana*], black rhinoceros [*Diceros bicornis*], leopard [*Panthera pardus*], Cape buffalo [*Syncerus caffer*], and lion [*Panthera leo*]) (Goodwin and Leader-Williams 2000, Okello et al. 2008), although Okello et al. (2008) suggest that each protected area should also market other animals. However, in the case of Rubondo Island National Park, no members of the "big 5" naturally occur (although the elephant was introduced to the Island in the 1960s and 1970s [TANAPA 2003]). Marketers must therefore focus on other species without a history of successfully attracting tourists. Unfortunately, little attention has been given overall to assessments of the species or experiences of interest to tourists (Fredline and Faulker 2001, Moscardo et al. 2001, Moscardo and Saltzer 2004, Valentine and Birtles 2004), although tourists' interests and expectations are widely acknowledged to be diverse (e.g., Green et al. 2001, Moscardo et al. 2001, Tremblay 2002, Lindsey et al. 2007).

Various researchers have investigated factors contributing to the enjoyment of tourists visiting specific destinations, and the resulting conclusions provide insight into wildlife viewing preferences in general. The factors thought to affect people's species preferences include the animals' characteristics and behaviors, as well as symbolic features a species may be associated with (e.g., for many people in the USA the bald eagle [*Haliaeetus leucocephalus*], the country's national symbol, represents freedom), which are likely to differ across culture and time, and be influenced by education and portrayal in the mass media (Moscardo et al. 2001, Moscardo and Saltzer 2004). Large mammals often are indicated as important for various wildlife tourism destinations. For example, visitors to Great Smoky Mountains National Park in Tennessee, USA, focused on viewing large mammals (e.g., white-tailed deer [*Odocoileus virginianus*] and black bears [*Ursus americanus*]—Hammit et al. 1993), and tourists in Kenya particularly wanted to see large herbivores and carnivores (Okello 2005). Visitors to South Luangwa National Park in Zambia also most wanted to see large animals (Goodwin and Leader-Williams 2000). Seeing "big game," and, more particularly, elephants, was important to 47% and 77%, respectively, of self-guided tourists in Addo Elephant National Park, South Africa. Tourists also tended to focus on opportunities to view mammals when visiting the Park (Kerley et al. 2003). Tour operators marketing southern Africa thought their clients would be most interested in seeing the "big 5," and would not be interested in birds or smaller mammals (Goodwin and Leader-Williams 2000, Okello et al. 2008). However, this focus on large mammals certainly is not the case among tour operators everywhere. In Australia, for example, birds (68%) and reptiles (49%) were the 2 taxa most sought on tours by operators, likely because both groups include large numbers of species and are more reliably seen than local mammals (Rodger et al. 2007).

Factors that have been suggested by Green et al. (2001) as important to tourist appeal (based on a review of the literature about the publics' general species preferences, research to determine the species most appealing to visitors in specific areas, and the perceptions of tourism experts) include: size, bright colors, charisma or "cuteness," elegance, relatedness to humans (actual or perceived based on appearance), presence of young, oddities (e.g., the scales of pangolins [*Manis* spp.]), or attention-attracting sounds. However, the factors important to a species' appeal likely vary by venue (e.g., a zoo versus a national park) and tourist demographics, and extrapolating tourists' preferences based on a particular place or type of experience can prove erroneous—e.g., the popularity of animals in zoo exhibits also may be partly a function of the way different species are displayed and interpreted, not solely the result of characteristics exhibited by that particular species (Moscardo et al. 2001). In addition, tourists seeking connections with the culture or environment of an area may be attracted to species that are culturally, ecologically, and economically relevant, not necessarily appealing based on appearance or behavior (Tremblay 2002). Recently, new groups of species, including small invertebrates (e.g., butterflies), have emerged as subjects for wildlife watching (Valentine and Birtles 2004).

The behavior of a species likely also influences tourists' perceptions of its appeal. Okello et al. (2008) reported that tourists in Amboseli National Park, Kenya, responded not only to extraordinary abundance of single or mixed grazing species, very rare species, and carnivores, but also to animals that were interacting with one another (e.g., allogrooming). Behaviors such as impressive courtship displays or unusual nest-building behavior also may attract tourist interest when the species' appearance alone likely would not do so (Green et al. 2001). In addition, potentially dangerous animals also may be enticing for tourists seeking thrills or adventure (Trembley 2002). Visitors to protected areas in South Africa, for example, rated the presence of large predators as the second most important feature of protected areas (behind mammal diversity) (Lindsey et al. 2007).

Some species, such as kangaroos in Australia (which are recognized as Australian by 98% of Americans—Hill et al. 2000), are widely associated with a specific destination. Such species (i.e., wildlife tourism icons—Stevens et al. 2007) may, through their physical or behavioral characteristics, representativeness of a specific area, or cultural significance, serve as an attraction for a contextually significant number of tourists. In Madagascar, for example, tourists most wanted to see lemurs (Goodwin and Leader-Williams 2000), and in Australia, they most wanted to view koalas *(Phascolarctos cinereus)*, estuarine crocodiles (*Crocodylus porosus*), and red kangaroos (*Macropus rufus*), and were less interested in viewing less well-known animals, such as platypuses (*Ornithorhynchus anatinus*) (Fredline and Faulkner 2001, Tremblay 2002, Prideaux and Cogland 2006).

Visitor interest in viewing various species likely differs not only among destinations, but also among market segments (e.g., male vs. female [Prideaux and Cogland 2006], resident versus foreign, older versus younger, and experienced versus inexperienced visitors [Lindsey et al. 2007]). The factors reported important for a quality wildlife viewing experience also can vary by nationality (Fredline and Faulkner 2001, Moscardo and Saltzer 2004), gender, or status as a first-time visitor to an area (Hammit et al. 1993, Fredline and Faulkner 2001). Understanding the "type" of visitor entering the area to be marketed and how demographics variables may influence wildlife viewing preferences is critical to choosing flagship species for wildlife tourism. For example, tourists who travel to less popular National Parks in Tanzania (like Rubondo) tend not to be first-time visitors to the country (Bonine et al. 2004). Important distinctions also have been noted in the wildlife viewing preferences of first-time and returning tourists in other areas. For example, first-time visitors to Australia were most interested in viewing iconic marsupials, whereas return visitors were more likely to seek opportunities to view other types of animals (Fredline and Faulkner 2001). Lindsey et al. (2007) likewise reported that local visitors, experienced wildlife viewers, and sometimes older guests showed a greater interest in less high-profile mammal species than foreign and inexperienced guests in protected areas in South Africa.

I assessed the wildlife viewing preferences and interests of visitors to Tanzania from outside East Africa, and whether those interests differ among various demographic and interest groups. An important element of my assessments included comparisons of participants' levels of interest in more and less well-known species. This is the first assessment that I am aware of regarding tourists' wildlife viewing interest that focused in large part on lesser-known African wildlife species. The immediate practical application of this research is to inform marketing efforts for Rubondo. Consequently, I included many of the species occupying the Park in my survey, and apply the results obtained to Rubondo as a case study.

Methods

Focal Region and Audience

In 2006, 644,124 international visitors entered Tanzania, generating $862 million USD in receipts (Ministry of Natural Resources and Tourism 2007). Of those visitors, the largest non-East African contingency came from Europe (~35% of visitors) and North America (~10% of visitors) (Ministry of Natural Resources and Tourism 2007). Eighty-one percent of international visitors were in the country for the purpose of leisure, recreation, or holiday (Ministry of Natural Resources and Tourism 2007). Visitation to Tanzania is generally lowest in April and May and highest in August and September (Ministry of Natural Resources and Tourism 2007—Figure 5.1); visitation to the famed Serengeti National Park follows similar trends (D. Nuhu, Serengeti National Park, personal communication). The average number of days in Tanzania per visit in 2006 for international tourists was about 12 (Ministry of Natural Resources and Tourism 2007). Most international tourists to Tanzania travel and organize travel with tour companies (Bonine et al. 2004).

There are 3 tourism "circuits" (i.e., clusters of protected areas within reasonable driving distance of one another that are often marketed together) in Tanzania (Wade et al. 2001, Okello and Yerian 2009). The most popular, the "Northern Circuit," includes 6 protected areas: Ngorongoro Conservation Area and Tarangire, Lake Manyara, Serengeti, Arusha, and Mt. Kilimanjaro National Parks (Okello and Yerian 2009, Figure 5.2). Some "Northern Circuit" tourists also visit Zanzibar and Dar Es Salaam. Less traveled are the "Southern" and "Western" circuits. The "Southern Circuit" includes Ruaha and Mikumi National Parks and the Selous Game Reserve, and the "Western Circuit" includes the famed Gombe National Park (Wade et al. 2001). Rubondo Island National Park is generally considered part of the "Western Circuit" (Tanzania Tourist Board 2011), although the Park is similarly close to the popular Northern circuit.

Non-residents represent the largest percentage of visitors to Tanzania's National Parks (TANAPA, unpublished data). The importance of non-resident tourists for National Park revenue generation is compounded by the differences in fees paid by residents of the East African community countries (Kenya, Uganda, Tanzania, Rwanda and Burundi) versus visitors from other areas. The daily entry fee for Serengeti National Park, for example, is close to $1 USD for Tanzanians over 16, whereas for non-Tanzanians of the same age group it is $50 USD (TANAPA 2011*c*).

Because the immediate practical application of this research was informing marketing strategies for Rubondo Island National Park, surveys were administered at the nearest Tanzanian international airport to Rubondo (i.e., Kilimanjaro International Airport—KIA). KIA is also the closest airport to the tourist-attracting "Northern Circuit," and where I expected to find the most diverse group of tourists with the potential to visit Rubondo. Conducting surveys at the airport enabled inclusion of travelers who may not have visited or intended to visit any protected areas during their visit.

The Survey

The survey (Appendix F) administered to travelers included questions about participants' country of residence, age, gender, level of education, and whether they were retired. In addition, I asked whether participants were traveling with children or a tour company, the purpose for the day's travel (i.e., business, pleasure, volunteering, other), whether participants had ever vacationed for the primary purpose of wildlife viewing, the importance of wildlife viewing in their vacation planning, and their self-assessed general level of wildlife knowledge. In addition, residents of countries outside Africa were asked if this was their first visit, and if so, the number of days on the Continent so far.

I asked participants about their interest in viewing 20 wildlife species, and if they had "heard of" each species (Table 5.1). For some of those species, I also asked participants: to rate their level of knowledge, to rank their interest in viewing the animal in relation to other animals (by giving a 1 to the animal of most interest and a 7 to the animal of least interest), and whether they had seen the animal (either in the wild, in captivity, in photos, or on television) (Table 5.1). Along with the survey, all participants were given an additional sheet that contained labeled images of each of the 20 species. I specifically chose species for inclusion in the survey to represent varying: sizes; levels of endemism, fame, and danger posed; diets; attractiveness; uniqueness; and taxonomies (i.e., bird, mammal, or reptile). All of the “big 5” species were included. I asked about 10 species that I expected to be fairly well-known to participants (buffalo [*Syncerus caffer*], chimpanzee [*Pan troglodytes*], crocodile [*Crocodylus niloticus*], elephant [*Loxodanta africana*], giraffe [*Giraffa camelopardalis*], hippopotamus [*Hippopotamus amphibius*], leopard [*Panthera pardus*], lion [*Panthera leo*], rhinoceros [as pictured, white rhinoceros: *Ceratotherum simum*], and vervet monkey [*Cercopithecus pygerythrus*]), and 10 (bushbuck [*Tragelaphus scriptus*], fish eagle [*Haliaeetus vocifer*], genet [as pictured, large-spotted: *Genetta tigrina*], goliath heron [*Ardea goliath*], jackal [as pictured, black-backed: *Canis mesomelas*], mongoose [as pictured, banded: *Mungos mungo*], monitor lizard [*Varanus niloticus*], serval [*Felis serval*], sitatunga [*Tragelaphus speki*], and spotted-necked otter [*Lutra maculicollis*]) that I expected to be little-known. Because an immediate applied purpose of this research was to gain better understanding of the species that may be used to market Rubondo, I included 13 species present on the Island.

Surveys were administered in the departure lounges of KIA. All travelers not otherwise occupied (e.g., talking on a cell phone), regardless of nationality, were approached and asked to complete surveys. However, for the purpose of these analyses only participants who were residents of countries that are not part of the East African Community (i.e., that pay non-resident rates for Park entry) were included.

Statistical Analysis

Descriptive statistics were calculated for responses to each question using Stata/IC 11.0 (StataCorp, College Station, Texas 77845, USA). For the 2 types of questions regarding having "seen" and "heard of" each species (Table 5.1b [2 and 4]), non-response rates could not be assessed directly, because participants were asked only to check a box on the survey if they had either "seen" the animal (as opposed to not having "seen" it) or not "heard of" the animal (as opposed to having "heard of" it). Therefore, non-respondents could not be differentiated from respondents that *had not* "seen" or that *had* "heard of" an animal. Consequently, to gain some understanding participants' awareness of the series of questions (i.e., if they had seen that section of the survey), I calculated the percentage of participants who indicated having "seen" at least 1 of the animals asked about, and the percentage of participants that indicated having *not* "heard of" at least 1 of the animals asked about.

I determined the percentage of participants "interested" or "very interested" in viewing each species, and made descriptive comparisons of participants' levels of viewing interest among species. I then compared the proportion of participants "interested"/"very interested" in viewing each species among groups sharing various demographic characteristics and interests. Comparisons included:

- males versus females,
- retirees versus non-retirees,
- those holding Bachelor's degrees and above versus those without,
- African residents versus residents of other continents,
- first-time versus return visitors to the African continent,
- respondents who had gone on vacation with the primary purpose of wildlife viewing versus those who had not,
- those who considered wildlife important or very important in planning of vacations versus those who did not, and
- pleasure travelers using tour companies versus those traveling independently.

Residents of African countries were differentiated from other participants because the ranges of most of the animals in the survey include many other countries on the continent (Sinclair and Ryan 2003, Kingdon 2004), and participants from Africa may therefore have more familiarity with many included species. When sample size allowed, I further partitioned categories to facilitate comparisons. For example, I also made comparisons between only those males and females who had been on vacation with the primary purpose of wildlife viewing, and compared first-time visitors who had been on the continent <15 days to all other respondents. For all comparisons, I used Pearson's chi-square analysis of contingency tables (Zar 1999, Vaske 2008) to detect differences in the proportion of interested and very interested respondents between groups, using a significance level of $\alpha = 0.05$.

I also calculated the mean rank given to each of the 7 species participants were asked to put in order of viewing interest, and then made descriptive comparisons among the species. As above, I subsequently assessed whether respondents belonging to each of the groups mentioned gave the species a different rank (based on mean scores).

I characterized species as "well-known" or "little-known" based on whether <10 or ≥10 participants indicated having or not having "heard of" the species, respectively. (A fairly small number was chosen as the cutoff because of my inability to exclude non-respondents from data regarding having "heard of" species, which had the potential to make survey participants appear more familiar with the included species than they actually were.) I descriptively compared average interest levels for species considered "well-known" versus "little-known." In addition, when distributions allowed (i.e., for the—otter, sitatunga, serval, goliath heron, and genet), I used Pearson's chi-square (Zar 1999, Vaske 2008) to determine whether there were differences in the frequencies of participants interested or very interested in viewing the species (versus all other categories) between those who indicated not having "heard of" the species and others ($\alpha = 0.05$). (This was not done for species >20% of participants had heard of because the number of people not knowing those species was not large enough to allow for comparison.)

Results

Two hundred and eighty-six travelers were asked to complete questionnaires. Thirty-six (12.6%) declined to participate, most commonly giving poor English as the reason (*n* = 15). Among the 250 participants, 146 (58.4% of the total) were from outside East Africa and therefore included in these analyses. (All subsequent references to African participants consequently refer only to the participants from countries other than Kenya, Uganda, Tanzania, Rwanda and Burundi.)

Non-response Rates

The average non-response rate for survey questions that could be measured (i.e., not including the questions regarding "having seen" and "having heard" about the species) was 3.4% (range: 0-30.1%) (Table 5.2). The greatest non-response rates occurred among the questions regarding interest in viewing particular species (Table 5.1b[3]). Within those questions, non-response rates were above the survey average of 3.4% only for species not heard of by >20% of participants. For those species with high non-response rates, participants that also indicated not having "heard of" the species comprised most of the non-responses (Figure 5.3). On average, 41.8% (range = 0-75.0%, sd = 18.9) of participants who indicated not having "heard of" the species did provide their level of interest in seeing that species (Figure 5.4). The resulting number of respondents for each question regarding viewing interest ranged from a low of 102 (69.9% of participants) for the sitatunga to a high of 146 (100%) for the giraffe (Table 5.3).

Most participants (95.9%) indicated having "seen" at least 1 species the question was asked about, suggesting, at a minimum, that those participants were aware of the presence of that series of questions. In contrast, the fact that 2.7% to 7.5% of participants (depending on the species) did not indicate that they had seen the species or an image of it, yet reported having at least some knowledge of the species does suggest that there was some level of non-response (as participants that have some knowledge of a species likely have seen at least an image of the species) (Table 5.4). Over half of participants (61.0%) indicated not having "heard of" at least 1 species included in the survey, suggesting at the least that they were aware of that portion of the questionnaire.

Demographics, Travel Purposes, and Interests

The 146 non-East African participants represented 27 different countries (Table 5.5). The largest percentage of participants (39.7%) were from the United States (n = 58). The next-most commonly represented country was Germany with 10.3% of participants (n = 15). Thirteen participants (8.9%) were from 6 different African countries. Participants ranged in age from 11 to 82 ($\bar{x}$ = 42.5, sd = 14.8). Just over half were female (52.1%). Participants were generally highly educated, with 48.0% holding a graduate degree and 30.1% a Bachelor's degree. The majority were not traveling with children (96.6%), nor were they retired (79.5%). Among the 133 residents of countries outside of Africa, 53 (39.9%) had not previously been to the continent. The number of days spent on the continent at the time of the survey for those first-time visitors ranged from 1 to 150 ($\bar{x}$ = 27.1, sd = 29.8). Only 1 survey participant was a first-time visitor who had spent <5 days on the continent prior to participation in the survey; 30 of the first-time visitors (56.6%) had spent <15 days on the continent.

The majority of participants (n = 89, 61.0%) were traveling solely for pleasure on the day they completed the survey, although 25 (17.1%) were traveling solely for business, 19 (13.0%) solely as part of a volunteer experience, and 9 (6.2%) solely for other reasons (most commonly educational [e.g., courses, trainings, school]). An additional 9 participants (6.2%) indicated >1 reason for day's travel; for 5 of those 9 participants the purposes included pleasure. Among the participants who were traveling for pleasure, 49.2% were using a tour company.

Just under half of respondents (49.0%) had ever (including this trip) gone on vacation with the primary purpose of viewing wildlife. Eighty-two respondents (59.0%) considered wildlife viewing opportunities important or very important in their vacation planning (Figure 5.5).

Knowledge of Wildlife Species

Most participants (84.25%) considered themselves at least somewhat knowledgeable about wildlife (Figure 5.6), although 61.0% indicated that they had not previously "heard of" ≥1 of the 20 species included in the survey and only 11.6% had previously seen at least an image of all of the 7 species the question was asked about (chimpanzee, crocodile, elephant, fish eagle, hippopotamus, sitatunga, and spotted-necked otter). Many of the species included in the survey were "well-known." All participants had heard of the buffalo, chimpanzee, crocodile, elephant, giraffe, hippopotamus, leopard and lion; all but 1 had heard of the rhinoceros, and all but 4 the jackal. The remaining 10 species—the bushbuck, fish eagle, genet, goliath heron, mongoose, monitor lizard, serval, sitatunga, spotted-necked otter, and vervet monkey—were "little-known." Among the "little-known" species, those that the lowest percentage of participants had "heard of" were the: sitatunga (known to 52.7% of participants), genet (63.0%), spotted-necked otter (66.4%), serval (70.6%), and goliath heron (74.0%) (Figure 5.7). The sitatunga, spotted-necked otter, and fish eagle had also been previously seen by the lowest percentage of participants (Figure 5.8). (Participants were not asked if they had seen the rest of the "little-known" species—i.e., the genet, goliath heron, and serval). Among the species for which "knowledge" questions were included (Table 5.1b[1]) (the chimpanzee, crocodile, elephant, fish eagle, hippopotamus, sitatunga, and spotted-necked otter), participants generally considered themselves at least somewhat knowledgeable about all but the spotted-necked otter, sitatunga, and fish eagle (about which 84.9%, 84.3%, and 58.2% of participants, respectively, considered themselves not at all knowledgeable) (Figure 5.9).

Interest in Wildlife Viewing Experiences

Respondents' "interested" or "very interested" in viewing various species ranged from a low of 53.7% for the goliath heron to a high of 90.3% for the leopard (Figure 5.10). At least 75% of respondents were "interested" or "very interested" in viewing 11 of the species asked about.

Those species that <75% of people were “interested” or “very interested” in seeing were, in order of increasing interest: goliath heron (53.7%), spotted-necked otter (59.5%), sitatunga (59.8%), fish eagle (65.6%), genet (67.0%), mongoose (69.6%), monitor lizard (69.9%), bushbuck (71.6%), and vervet monkey (73.6%).

Differences were detected in the proportions of males versus females “interested”/“very interested” in viewing the chimpanzee, fish eagle, genet, giraffe, hippopotamus, jackal, leopard, vervet monkey, spotted-necked otter, and serval (Figure 5.11, $p \leq 0.04$). However, among participants who had gone on vacation with the primary purpose of wildlife viewing, there were no detectable differences in the percentage of “interested”/“very “interested” males and females. There were no detectable differences either between interest levels of retirees and non-retirees. When comparing those with higher degrees (Bachelor’s and above) to those without, the only detectable difference in levels of interest was for the spotted-necked otter ($p = 0.04$), with those having less education more likely than expected to be “interested”/“very “interested” (Figure 5.12). Among participants that vacation for wildlife, the only detectable differences in interest levels between those with Bachelor’s degrees or above versus those without were for the hippopotamus and the rhinoceros ($p = 0.01$ for both), with those without Bachelor’s degrees or above being more likely than expected to be disinterested.

Differences in interest distributions between African and non-African residents were detectable for all species but the monitor lizard, fish eagle, spotted-necked otter, sitatunga, and goliath heron (Figure 5.13; for species with differences, $p \leq 0.03$). There were no differences in levels of interest in viewing any wildlife species among visitors who previously had been to Africa and those who had not (Figure 5.14), nor among first-time visitors who have been there <15 days in comparison to all other respondents (i.e., first-time and return). Respondents who reported having gone on vacation with the primary purpose of viewing wildlife were more “interested” in seeing the buffalo, giraffe, and serval than those who had not (Figure 5.15; $p \leq 0.03$ for all). Respondents who considered wildlife important or very important to planning of vacations were more “interested” than all other respondents in viewing all but 7 species: bushbuck, fish eagle, monitor lizard, mongoose, monkey, sitatunga, and otter (Figure 5.16, for those species showing differences, $p \leq 0.05$). Within the participants traveling only for pleasure the day of participation, there were no differences in interest levels for any species between clients of tour companies and independent travelers (Figure 5.17).

Of species that participants were asked to rank their interest in (the chimpanzee, crocodile, elephant, fish eagle, giraffe, sitatunga, and spotted-necked otter), respondents were most “interested” in seeing the elephant ($\bar{x}_{\text{rank}} = 2.25$), followed by the giraffe (2.70), chimpanzee (3.26), crocodile (4.10), sitatunga (5.02), fish eagle (5.05), and spotted-necked otter (5.19) (Figure 5.18). Among all of the groups considered (i.e., retirees, African residents, females, etc.), the order of the 3 species of greatest interest did not change. The crocodile also remained the 4$^{\text{th}}$ most interesting species among all groups except African residents, who considered the crocodile of the least viewing interest of all the species. However, the order of viewing interest ascribed to the 3 species of least interest—the sitatunga, fish eagle, and spotted-necked otter—regularly changed among participant groups (Table 5.6).

Relationship Between Knowledge and Interest

Respondents were generally less “interested” in viewing the “little-known” species than the “well-known” ones, and the average percent of “neutral” and “not sure” responses were also higher for the former (Figure 5.19). In addition, interest generally increased, with a few exceptions, as the number of participants who had “heard of” the species increased (Figures 5.18 and 5.20). However, the respondents who had “heard of” a least-known species (i.e., spotted-necked otter, sitatunga, serval, goliath, and genet) were no more or less likely to be “interested” or “very interested” in viewing the species than respondents who had not “heard of” it ($p \geq 0.09$).

Discussion

Survey participants represented many countries, and were diverse in age, gender, interest in wildlife viewing, and self-reported levels of wildlife knowledge. Most participants were fairly highly educated, not traveling with children, and not retired. Nearly 40% were first-time visitors to Africa. Although 61.0% of participants were traveling for pleasure, others were traveling for business, to volunteer, and for other reasons. Among the pleasure travelers, independent travelers and those using tour companies were nearly evenly represented.

Knowledge of Wildlife Species

The most well-known animals included members of the “big 5” and other large species often associated with Africa (e.g., giraffe and hippopotamus). Many of the smaller, less publicized species were little-known. Over 25% of participants had not “heard of” the sitatunga, genet, spotted-necked otter, serval, and goliath heron; >10% had not “heard of” the fish eagle, monitor lizard, and bushbuck. Also unknown to >1 participant were the vervet monkey, mongoose, and jackal. Most of these results were expected, with the exception of the vervet monkey being less well-known than the mongoose and jackal.

Participants’ apparently greater unfamiliarity with the vervet monkey in comparison to the mongoose and jackal may have been influenced by the specificity of the names used in the survey. Although, for example, I specified the type of monkey (vervet), I did not specify the *banded* mongoose or *black-backed* jackal, although those were the species pictured. Similarly, I specified the *spotted-necked* otter, but not the *African* buffalo, or *large-spotted* genet. Had I simply asked about otters and monkeys more people may have indicated having “heard of” them. Conversely, had I included “black-backed” in the name of the jackal or “banded” in the name of the mongoose, more people likely would indicated not knowing the species. Using more comparably specific names could have resulted in the outcome I had initially expected: i.e., vervet monkey being in the “well-known” category and jackal in the “little-known.”

For those species I asked participants about having “heard of,” having “seen”, and having knowledge of, trends were generally consistent (i.e., species that participants indicated having little knowledge of were also little “seen” and little “heard of”). One difference, however, is that although similar percentages of participants indicated having knowledge of and having “seen” the sitatunga and spotted-necked otter, nearly 15% more participants indicated not having “heard of” the sitatunga. I suspect this difference is related to the presence of various species of otters on other continents.

Another slight discrepancy is evidenced by the percentage of participants that indicated they had some knowledge of a species, but also indicated that they had not “seen” the species or an image of it. With the exception of having learned about an animal through word-of-mouth, I suspect people having knowledge of a species have seen an image of it at a minimum. Therefore, I believe it is likely that at least some of the participants indicating knowledge of species but not indicating having seen even an image of it were actually unidentifiable nonrespondents to the question regarding having “seen” the species. Alternatively, some of the participants indicating knowing about but not having seen an image of a species may not have read the directions fully and instead had not seen the animal in the wild. Overall, however, this discrepancy should not compromise conclusions because inability to eliminate non-respondents and those not following directions properly for the 2 types of questions indicating familiarity with a species (having “seen” and “heard of” the species) would bias results in opposite directions.

Interest in Wildlife Viewing Experiences

Participants indicated a fairly high level of interest in seeing all species included in the survey; none were of viewing interest to ≤50% of participants. Over 80% of participants were “interested” or “very interested” in seeing the leopard, lion, giraffe, elephant, hippopotamus, rhinoceros, and chimpanzee. The lion and leopard tied as the species the greatest percentage (73.8%) of participants were “very interested” in seeing. Those species were followed by rhinoceros (69.9%), elephant (66.2%), and giraffe (63.7%). Less than 30% of participants were “very interested” in seeing the spotted-necked otter (23.3%), goliath heron (25.6%), sitatunga (26.5%), and mongoose (29.6%). Perhaps most noteworthy is that the percentage of participants indicating they were “uninterested” or “very uninterested” in each species varied by just 6.6%, whereas the percentage of participants who were “neutral” or “not sure” varied by 30.0%. Participants’ apparent tendency to choose “neutral” or “not sure” instead of indicating disinterest in viewing a species suggests that many visitors could possibly be readily interested in species currently receiving little attention.

Levels of “interested” and “very interested” participants varied somewhat among demographic/interest groups and species. However, these results may be of little consequence outside of very specific marketing purposes. Likely of greatest interest is the finding is that participants from Africa were less interested in nearly all species, and any lack of difference seen appears to be a function of interest decreasing among participants from other continents. This may, however, have been a function of the small number of Africans included in the sample, and perhaps the fact that a smaller percentage were traveling for pleasure. I suspect, given a larger sample, other patterns may have been detected, such as particular groups showing more interest in less high-profile species (as was reported for local residents, older participants, and experienced wildlife viewers by Lindsey et al. [2007]).

In addition to influencing participants’ indications of their familiarity with a species, the difference in the specificity of names used for different species in the survey may have influenced interest levels (although I suspect potential effects were largely minimized by the photo provided for each species; see Appendix F). Using very specific names for species may lead certain tourists, such as “serious” wildlife tourists, who often seek specific species and are motivated by the desire to learn about the species seen (Curtin 2010), to indicate a greater level of interest in those species. In addition, had the fish eagle been labeled *African* fish eagle or the buffalo *African* buffalo, or had, for example, range maps showing the limited distributions of certain species been included in the survey, participants may have shown additional interest in those species. Such was the case in choice experiments designed to assess the potential of various bird species for international flagships; one of the characteristics held by the species determined most effective was endemism (Veríssimo et al. 2009).

Relationship Between Knowledge and Interest

All "well-known" species (leopard, lion, giraffe, elephant, hippopotamus, rhinoceros, chimpanzee, jackal, buffalo, and crocodile) were considered interesting or very interesting to greater proportions of participants than species considered "little-known." It is unknown whether well-known species have become famous because of some intrinsic quality that appeals to tourists or whether the species appeal to tourists because they are famous. The quality of a wildlife tourism experience has been suggested to be influenced by the species' popularity and status (i.e., rarity) (Reynolds and Braithwaite 2001), and tourists have been suggested to be interested in seeing rare, large, unusual, unique or new species (Leuschner et al. 1989, Davis et al. 1997, Moscardo et al. 2001, Saltzer 2002, Saltzer 2003*a-d*, Moscardo and Saltzer 2004, Lindsey et al. 2007). The most popular species among participants in this study all share at least some of the aforementioned characteristics (rarity, uniqueness, large size, and popularity [i.e., fame]). The species that were of less interest to participants in my survey are generally smaller than the more popular species and less rare. However, no characteristic alone explained levels of interest perfectly, likely because participants' levels of interest were based on many factors in combination. In addition, to be interested in a species based on its rarity tourists must know that the species is rare. The sitatunga, for example, is often considered rare in some areas of Africa (IUCN SSC Antelope Specialist Group 2008), but was among the species of least interest to participants. Additional research to determine the effect the provision of such information has on people's viewing preferences may be wise.

Participants regularly neglected to answer questions about their interest in viewing species that they also indicated not having "heard of." Unfortunately, I believe this is a problem with survey design. My suspicion that some participants who did not read directions completely assumed only 1 item in the survey row (i.e., only their level of interest in viewing the species or "I have not heard of this animal"—Table 5.1b [3 and 4]) should be checked was confirmed by later trials. Others may have felt unable to provide their level of viewing interest having not "heard of" a species, but the provision of a picture sheet likely minimized such occurrences. The lower response rates among participants that had not "heard of" a species apparently did not affect results because there were no differences in interest levels between participants that had and had not "heard of" the species I assessed.

Implications for Wildlife Tourism

The results from my relatively small sample likely should not be generalized to all visitors, nor any market segment, but do provide a basis for understanding the wildlife viewing preferences of visitors to Tanzania. In addition to knowing how interested a sample of tourists generally are in viewing various wildlife species, however, people desiring to market a protected area based on wildlife viewing experiences need to consider several other practical factors. For example, one factor that has been suggested as important to the wildlife viewing experience is the ability to get close to animals (Davis et al. 1997, Moscardo et al. 2001) (although "close" is a subjective term and likely interpreted differently among individuals). Therefore, depending on the tolerance for disturbance of the various species most popular among tourists, managers may be more or less willing to allow or enable viewing of the animals.

For an area to be a successful wildlife tourism destination, not only do people need to be interested in viewing the species present and protected area authorities willing to allow tourism focused on those species, but in areas like Tanzania where independent travel is unusual (Bonine et al. 2004) and can be difficult, tour operators should be willing to provide tours to see the species. This is particularly important because tour operators also help market wildlife viewing attractions (e.g., Okello 2005). However, tour operators' interest in marketing and providing tours to see species may not hinge only on tourists' interest in species, such as is reported here, but also factors such as the chances of seeing a species, and how, where, and when the species is best seen—in part because viewing the desired species is important to satisfaction among their clients (i.e., wildlife viewing tourists; Hammit et al. 1993, Fredline and Faulkner 2001). Possibly as a result of the considerations of tour operators, predictability (e.g., regular use of particular habitat features) has been suggested as a key feature of better-known species for wildlife watching and a critical element in the success of marketing wildlife tourism (Goodwin and Leader-Williams 2000, Valentine and Birtles 2004). Researchers in Tasmania included in their inventory of the Island's wildlife viewing opportunities only those species that tourists had ≥80% chance of viewing (Kriwoken et al. 2002), although others have suggested that an animal does not always need to be seen to be included on a tour as long as evidence of the animal's current (e.g., a bird's song) or past (e.g., sign such as tracks) presence is available (Green et al. 2001). Therefore, when considering the choice of a species to market as a tourist attraction it is important to consider the state of knowledge about the animal's geographic range, habitat, and seasonal availability, as well as the habitat features (e.g., a watering hole) that cause the animals to congregate. Tour operators may be less willing to provide tours highlighting species that are more difficult to view.

Finally, although the role of well-known species in initially attracting tourists to an area should be recognized, diversity has also been reported as important to the visitor experience (e.g., Lindsey et al. 2007). Researchers in Australia suggest that although visitor satisfaction probably depends in part on seeing animals the visitor is already aware of and associates with Australia, promised sightings of those species can be used to encourage tourists to visit areas where, through appropriate interpretation, interest in lesser-known species can be fostered (Green et al. 2001). In South America, for instance, although few people traveled to Manu National Park, Peru, with the intent of viewing the giant otter (*Pteronura brasiliensis*), almost all who did see the animals considered the experience the highlight of their trip (Dunstone and O'Sullivan 1996). Therefore, the smaller and less well-known species included in my survey may be critical to the satisfaction of wildlife viewing tourists even though not of the highest interest to them.

Implications for Rubondo Island National Park

As noted by Veríssimo et al. (2009), many areas important for biodiversity conservation, such as tropical islands, lack the charismatic megafauna typically used as international flagships. Such appears to be the case with Rubondo Island National Park, which does not contain many of the species shown to be highly popular by this research (e.g., leopard, lion, rhinoceros, jackal, buffalo, or serval). Species asked about on this survey that occur in Rubondo and were of the most interest to tourists are likely of limited use as flagship species for the area. The elephant and giraffe, both "interesting" or "very interesting" to a high percentage of participants, are present on the Island, but were introduced, as was the chimpanzee. Using these species to market Rubondo would neglect the importance of cultural or historical representativeness to tourists seeking connections with the area (Tremblay 2002). In addition, the sustainability of using an introduced species to market tourism in a national park is questionable. In the case of the chimpanzee, the animals also are rarely seen on Rubondo. Basing advertising on species that tourists are unlikely to see may have negative implications for tourist satisfaction. The hippopotamus and crocodile, both of high interest as well, are native to the area, but, like the elephant, giraffe, and chimpanzee, can been seen more easily and likely better (e.g., in the case of the hippopotamus—spend more time out of the water and in plain view) in other national parks that are easier to access. Because novelty and seeing unique or unusual species is an important motivation for tourists (Moscardo et al. 2001, Pearce 2005), Park officials at Rubondo may be wise to choose species for international flagships that are not also used as tourism flagships in more easily accessed areas.

Rubondo contains all of the species of interest to <75% of tourists (the vervet monkey, bushbuck, monitor lizard, genet, fish eagle, sitatunga, spotted-necked otter, goliath heron, and mongoose [although the Island has only the marsh [*Atilax paludinosus*] and not the banded mongoose pictured in the survey, I expect the interest levels would be similar for both species]). Of those species, the spotted-necked otter, sitatunga, and fish eagle probably are the most unique viewing experiences that are not marketed in more readily-accessible areas. The otter is unusually visible in Rubondo's waters, the sitatunga has a limited range and is also very easily viewed on the Island, and the fish eagle occurs at high densities and is easily viewed along the shore.

A final consideration in choosing species to market as international tourism flagships is local attitudes toward those species. Using a controversial species as a tourist attraction likely could be problematic (Tremblay 2002), and therefore local and international attitudes toward the species in question should be definitively determined. Support from host communities, which is imperative to the sustainability of wildlife tourism activities, also may depend on how local people value the species around which tourism is (or will be) based (Burns 2004). Communities around Rubondo have little affinity for or desire to live near 2 of the species (the hippopotamus and crocodile) that were of interest to >75% of tourists surveyed and 4 of the species of lesser interest (monitor lizards, vervet monkeys, spotted-necked otters, and large-spotted genets—although the latter 2 species also were little-known locally) (Chapter 2). The implications for conservation of using any species that is little liked or desired locally as an international flagship should be given serious consideration.

Perhaps if, after additional consideration and consultation with local people, Park management were interested in focusing marketing efforts on little-known species such as the spotted-necked otter, fish eagle, or sitatunga, they could entice potential visitors to travel to Rubondo to see those species by increasing awareness of them among target market segments. This, however, is likely neither practical nor feasible in the near-term. A more likely alternative may be to focus marketing strategies on tourist segments that would be particularly interested in viewing opportunities for those species (e.g., for the otter and sitatunga, members of their respective IUCN SSC Specialist Groups). Rubondo's management should also consider as flagships species not included in my survey. The Parks' >200 bird species (TANAPA 2003) may be of great interest to birders (subgroups of which make substantial investments in related travel—e.g., Eubanks et al. 2004) , and its diversity of orchid (family Orchidaceae) and butterfly (order Lepidoptera) species (TANAPA 2003) are also likely of interest to specific market segments.

Park management may also want to consider how wildlife could be advertised not as flagships for a wildlife tourism destination, but instead to add value to other types of tourism experiences. Wildlife viewing is known to be of importance to many tourists—even if not always the primary consideration in vacation planning (Moscardo et al. 2001)—and seeing wildlife is thought to positively affect outdoor recreation experiences for many people (Leuschner et al. 1989). Rubondo could target travelers interested in the island environment (including the sandy beaches, which 35% of European tourists seek in combination with a safari―Wade et al. 2001), using wildlife to add value to that setting. While advertising the Park as a relaxing beach destination to be added on to the end of a safari, for example, the Park could market a suite of species related to the aquatic environment, such as fish eagles, spotted-necked otters, sitatunga, hippopotamuses, and kingfishers (family Alcedinidae) (should investigations find that those species would not be locally-controversial attractions). Rubondo is also unique among Tanzania's national parks in that it can be explored on foot because of the absence of large predators (TANAPA 2003). Rubondo's managers may find that the best option is advertising the Park as a destination for people interested in outdoor adventures. Another potential pool of visitors to Rubondo for whom many of the Island's wildlife species would be of value, particularly given the limited amount known about many of the populations, is researchers and their university courses or other institutions providing field experiences. Rubondo has a variety of valuable resources; appropriately marketing those resources with the goal of attracting a sustainable number of tourists to fund education, outreach, and patrol efforts will ensure the future protection of the Park. A logical next step in choosing a marketing strategy for the Park may be to assess current visitors' motivations for visiting and their perceptions of the destination's highlights, as well as the perceptions and preferences of tour operators.

Table 5.1 (a and b). The types of questions included for each species in my 2009 survey of the wildlife viewing interests of non-East African travelers at Kilimanjaro International Airport, Tanzania (a), as well as samples of each question type (b).

a. **Species**	**Questions asked**
1. Buffalo	Interest, heard of
2. Bushbuck	Interest, heard of
3. Chimpanzee	Interest, heard of, knowledge, seen, rank
4. Crocodile	Interest, heard of, knowledge, seen, rank
5. Elephant	Interest, heard of, knowledge, seen, rank
6. Fish eagle	Interest, heard of, knowledge, seen, rank
7. Genet	Interest, heard of
8. Giraffe	Interest, heard of, rank
9. Goliath heron	Interest, heard of
10. Hippopotamus	Interest, heard of, knowledge, seen
11. Jackal	Interest, heard of
12. Leopard	Interest, heard of
13. Lion	Interest, heard of
14. Mongoose	Interest, heard of
15. Monitor Lizard	Interest, heard of
16. Rhinoceros	Interest, heard of
17. Serval	Interest, heard of
18. Sitatunga	Interest, heard of, knowledge, seen, rank
19. Spotted-necked otter	Interest, heard of, knowledge, seen, rank
20. Vervet monkey	Interest, heard of

b. ***1. Knowledge***

	A. How knowledgeable do you consider yourself about each of the animals listed below? (Please check the appropriate box.)		
	Not at all	Somewhat	Very
Species	☐	☐	☐

2. Seen

B. Please place a check mark in the appropriate box below if you had seen the animals listed on the left **before participating in this survey** (in the wild, in captivity, in photos, on television, etc.).
☐

3. Interest / ***4. Heard of***

	Very Uninterested	**Uninterested**	**Neutral**	**Interested**	**Very interested**	**Not sure**		**I have not heard of this animal**
Species	☐	☐	☐	☐	☐	☐		☐

5. Rank

Please rank the following animals from 1 to 7, giving a **1** to the animal you would be **most interested** in viewing and a **7** to the animal you would be **least interested** in viewing. Please see the box below for an example.

_____Chimpanzee

_____Crocodile

_____Elephant

_____Fish eagle

_____Giraffe

_____Sitatunga

_____Spotted-necked otter

Example:

2 Pineapple
3 Orange
4 Mango
7 Lemon
1 Watermelon
5 Papaya
6 Apple

Table 5.2. The questions or types of questions included in my 2009 survey of travelers at Kilimanjaro International Airport, and levels of non-response for each among non-East African participants. Non-response for questions that are repeated for multiple species, such as those about interest in viewing different animals, is presented as averages, with range in parentheses. I was unable to ascertain rates of non-response for 2 questions: "having seen the species or an image of it prior to participation" and "having 'heard of' the species prior to participation."

Variable or Variable Type	**Percent non-response (as an average with range for multi-part questions)**
Level of knowledge about various species*	1.47 *(0.68 - 2.74)*
Having seen the species or an image of it prior to participation*	-
Level of interest in viewing each species†	8.22 *(0 - 30.14)*
Having "heard of" the species prior to participation†	-
Ranking of species by interest in viewing them‡	3.72 *(2.74 - 4.79)*
Age	13.01
Gender	0
Level of education	0
Traveling with children	1.37
Traveling with a tour company	2.06
Retired	3.42
Having been on vacation with primary purpose of wildlife viewing	2.06
Having been to Africa before (excluding African residents)	2.74
Number of days on continent as of survey (excluding African residents and previous visitors)	1.89
Purpose of travel	2.74
The importance of wildlife in planning vacations	4.79
Level of wildlife knowledge	3.42

*species included: chimpanzee, crocodile, elephant, fish eagle, hippopotamus, sitatunga, and spotted-necked otter.

† species included: buffalo, bushbuck, chimpanzee, crocodile, elephant, fish eagle, genet, giraffe, goliath heron, hippopotamus, jackal, leopard, lion, mongoose, monitor lizard, rhinoceros, serval, sitatunga, spotted-necked otter, and vervet monkey.

‡species included: chimpanzee, crocodile, elephant, fish eagle, giraffe, sitatunga, and spotted-necked otter.

Table 5.3. The number of respondents to questions regarding interest in viewing animals, by species, for my survey of non-East African travelers at Kilimanjaro International Airport, Tanzania regarding wildlife viewing preferences.

Species	**Respondents**
Buffalo	145
Bushbuck	134
Chimpanzee	144
Crocodile	144
Elephant	145
Fish eagle	131
Genet	106
Giraffe	146
Goliath heron	121
Hippopotamus	144
Jackal	141
Leopard	145
Lion	145
Mongoose	135
Monitor Lizard	133
Rhinoceros	143
Serval	119
Sitatunga	102
Spotted-necked otter	116
Vervet monkey	140

Table 5.4. The number and percentage of non-East African participants ($n = 146$) in my 2009 survey at Kilimanjaro International Airport, Tanzania, that did not indicate having "seen" the animal or an image of it, yet considered themselves "somewhat" or "very" knowledgeable about the species.

	Respondents who consider themselves "somewhat" or "very" knowledgeable about the species and also report not having "seen" the species or an image of it	
Species	***Number***	***Percent of Participants***
Chimpanzee	11	7.5
Crocodile	8	5.5
Elephant	4	2.7
Fish eagle	6	4.1
Hippopotamus	5	3.4
Sitatunga	5	3.4
Spotted-necked otter	7	4.7

Table 5.5.The country of origin of the 146 non-East African participants participating in my 2009 survey of travelers at Kilimanjaro International Airport, Tanzania, regarding wildlife viewing interests.

Country	**Number of participants**	**Percent of participants**
Australia	6	4.1
Austria	2	1.4
Cameroon	1	0.7
Canada	4	2.7
China	1	0.7
Cote d'Ivoire	2	1.4
Dominican Republic	1	0.7
Ethiopia	2	1.4
Finland	1	0.7
France	2	1.4
Germany	15	10.3
Ghana	2	1.4
Holland	3	2.0
Iceland	1	0.7
India	1	0.7
Ireland	3	2.1
Italy	1	0.7
Mexico	5	3.4
Netherlands	4	2.7
Norway	2	1.4
South Africa	4	2.7
Spain	2	1.4
Sudan	2	1.4
Sweden	8	5.5
Thailand	1	0.7
United Kingdom	12	8.2
United States	58	39.7

Table 5.6. The most and least interesting wildlife species according to various groups of non-East African respondents to my 2009 survey of travelers at Kilimanjaro International Airport in Tanzania.

<table>
<tr><th></th><th>All Respondents (n = 139-142)</th><th>Return visitors (n = 72-73); Have vacationed primarily to view wildlife (n = 68-70)</th><th>First-time visitors (n = 53); Short-term visitors (n = 30); Non-African residents (n = 129-130); ≥ Bachelor’s degree (n = 110)</th><th>Consider wildlife important or very in vacation planning (n = 81-82), Females (n = 75)</th><th>Independent (n = 39-40) and tour company (n = 47-48) pleasure travelers, < Bachelor’s degree (n = 32)</th><th>Males (n = 66)</th><th>African residents (n = 10-12)</th><th>Retirees (n = 21)</th></tr>
<tr><td rowspan="7">Most interested

Least Interested</td><td colspan="8">Elephant</td></tr>
<tr><td colspan="7">Giraffe</td><td>Chimpanzee</td></tr>
<tr><td colspan="7">Chimpanzee</td><td>Giraffe</td></tr>
<tr><td colspan="6">Crocodile</td><td>Sitatunga</td><td>Crocodile</td></tr>
<tr><td>Sitatunga</td><td>S-N otter</td><td>F. eagle</td><td>S-N otter</td><td>Sitatunga</td><td>Sitatunga</td><td rowspan="2">S-N Otter / F. eagle*</td><td>Sitatunga</td></tr>
<tr><td>F. eagle[1]</td><td>Sitatunga</td><td>Sitatunga</td><td>F. eagle</td><td>S-N otter</td><td>F. eagle</td><td>F. eagle</td></tr>
<tr><td>S-N otter[2]</td><td>F. eagle</td><td>S-N otter</td><td>Sitatunga</td><td>F. eagle</td><td>S-N otter</td><td>Crocodile</td><td>S-N Otter</td></tr>
</table>

* Tied
[1] Fish eagle
[2] Spotted-necked otter

Figure 5.1. Monthly trends in international visitation to Tanzania from 1996 to 2006. (Data from Tanzania Ministry of Natural Resources and Tourism 2007).

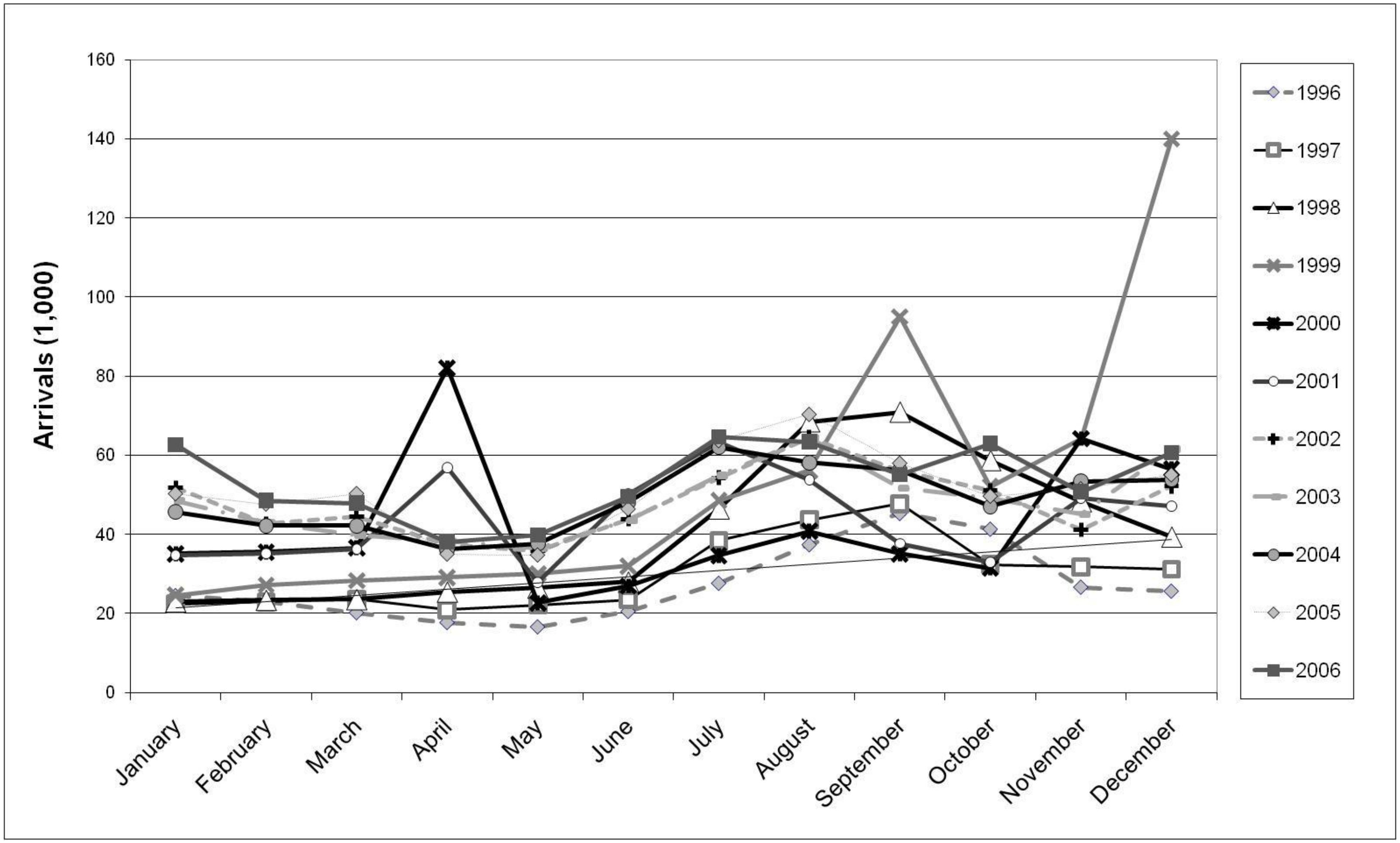


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Figure 5.2. The locations of Tanzania's national parks.

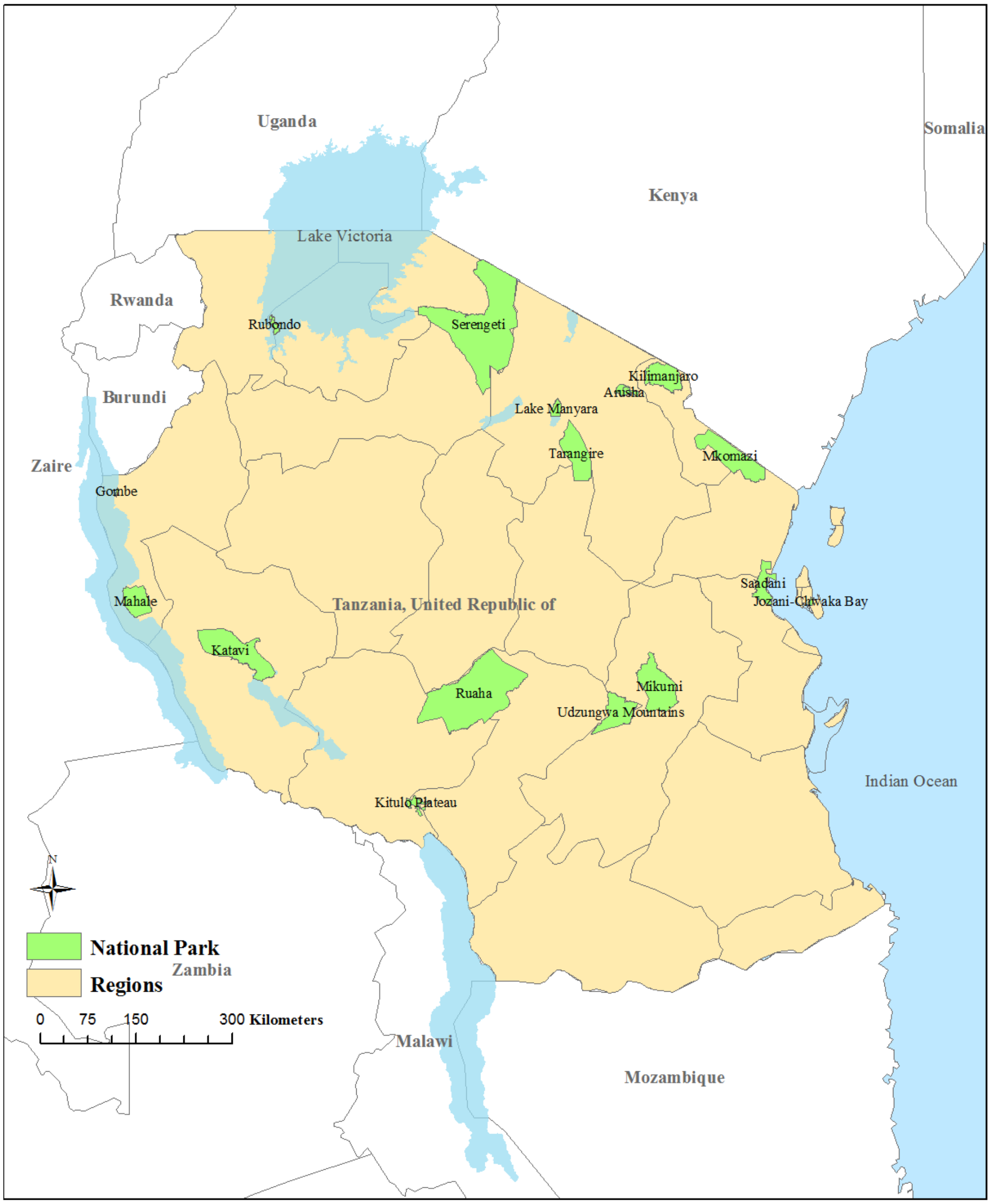

Figure 5.3. The number of non-respondents to questions in my 2009 survey of Non-East African travelers at Kilimanjaro International Airport, Tanzania, regarding level of interest in viewing various wildlife species, and whether those non-respondents also indicated having not “heard of” the species prior to the survey.

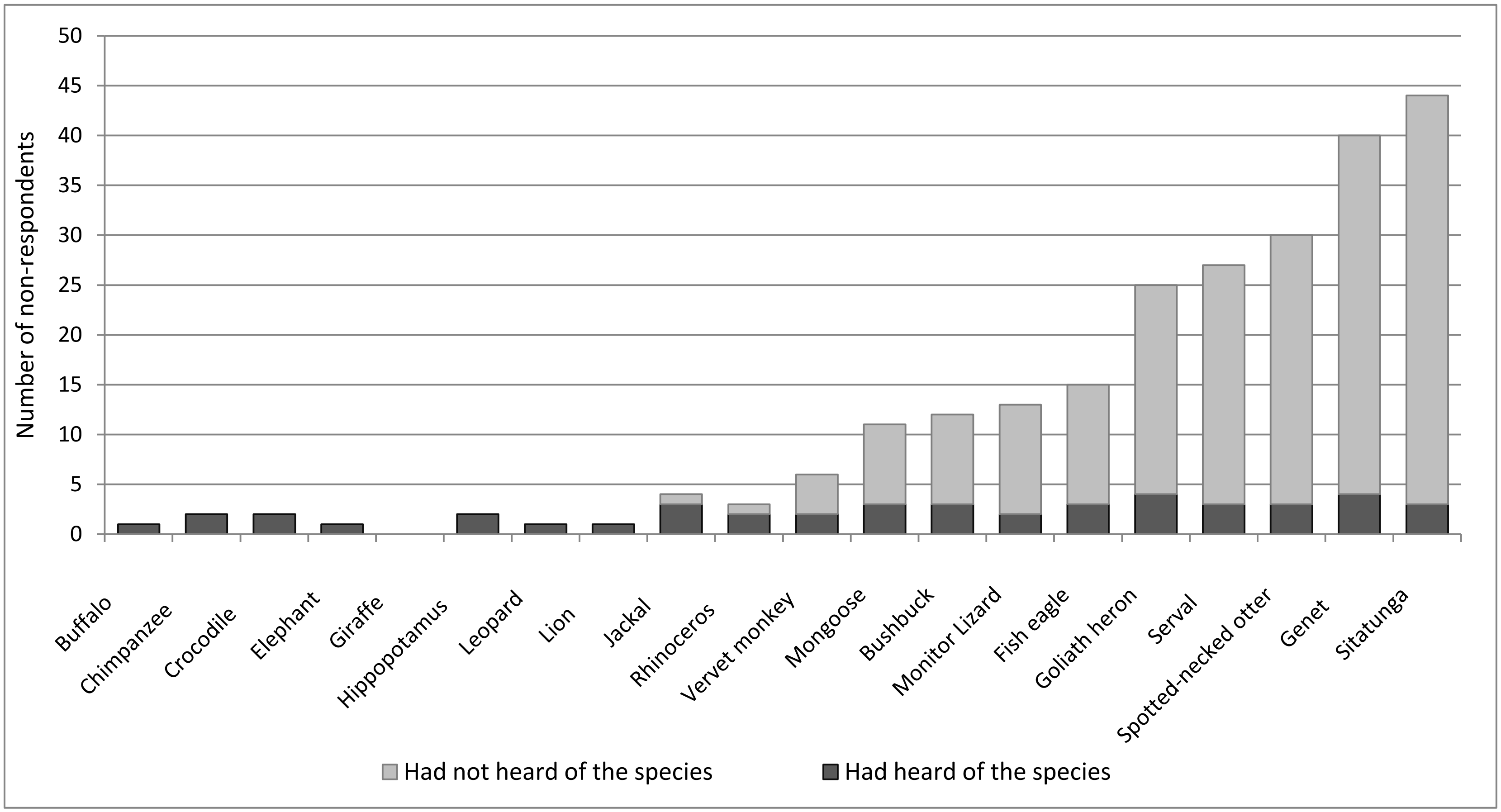

Figure 5.4. Participants who indicated not having “heard of” each of the wildlife species asked about in my 2009 survey of non-East African travelers at Kilimanjaro International Airport, Tanzania, and whether those participants provided a response to questions regarding their interest in viewing the species or not. (If all participants provided their level of interest in viewing a species, that species is not included in the chart.)

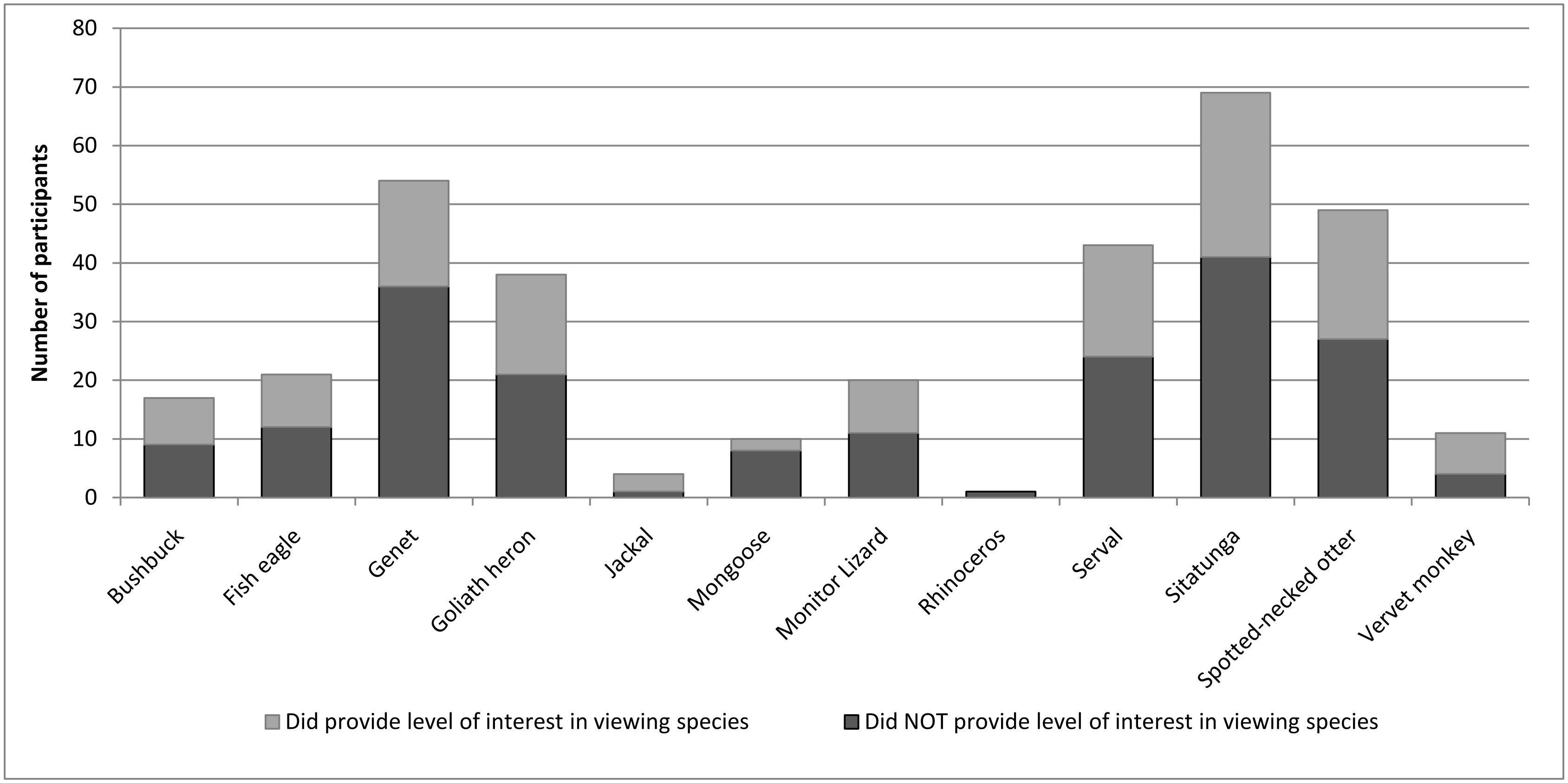

Figure 5.5. The general importance of wildlife viewing opportunities in the planning of vacations among the 139 non-East African visitors to Tanzania who responded to the question in my 2009 survey at Kilimanjaro International Airport regarding wildlife viewing preferences.

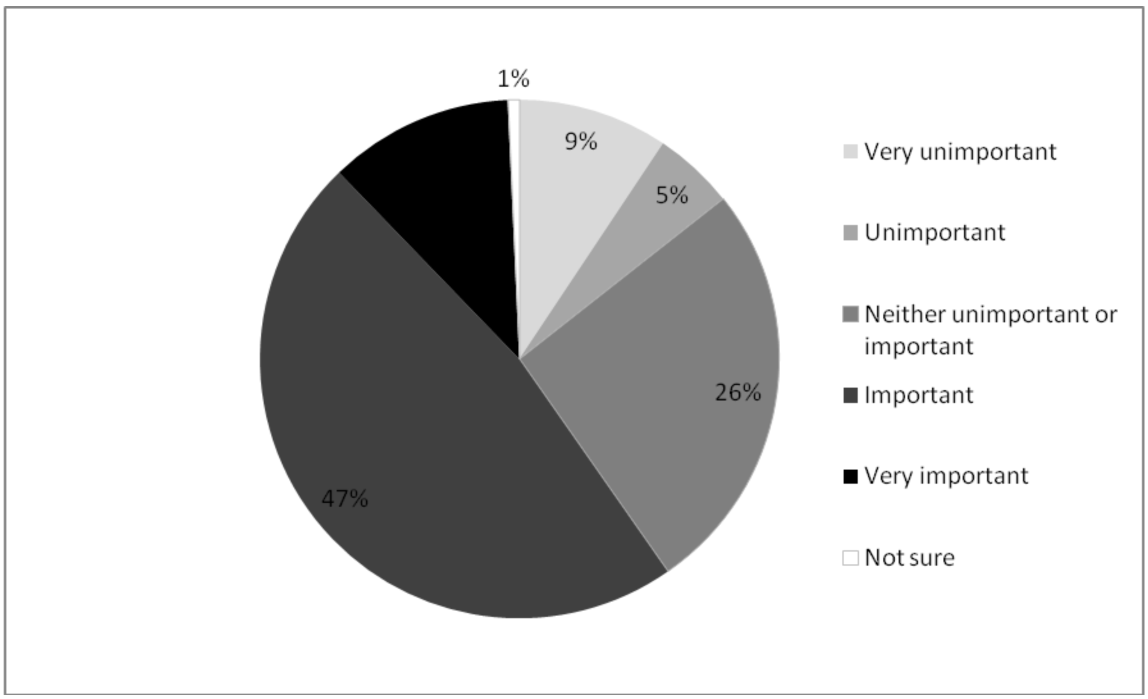

Figure 5.6. The self-reported level of wildlife knowledge among the 141 non-East African visitors to Tanzania who responded to the question in my 2009 survey at Kilimanjaro International Airport regarding wildlife viewing preferences.

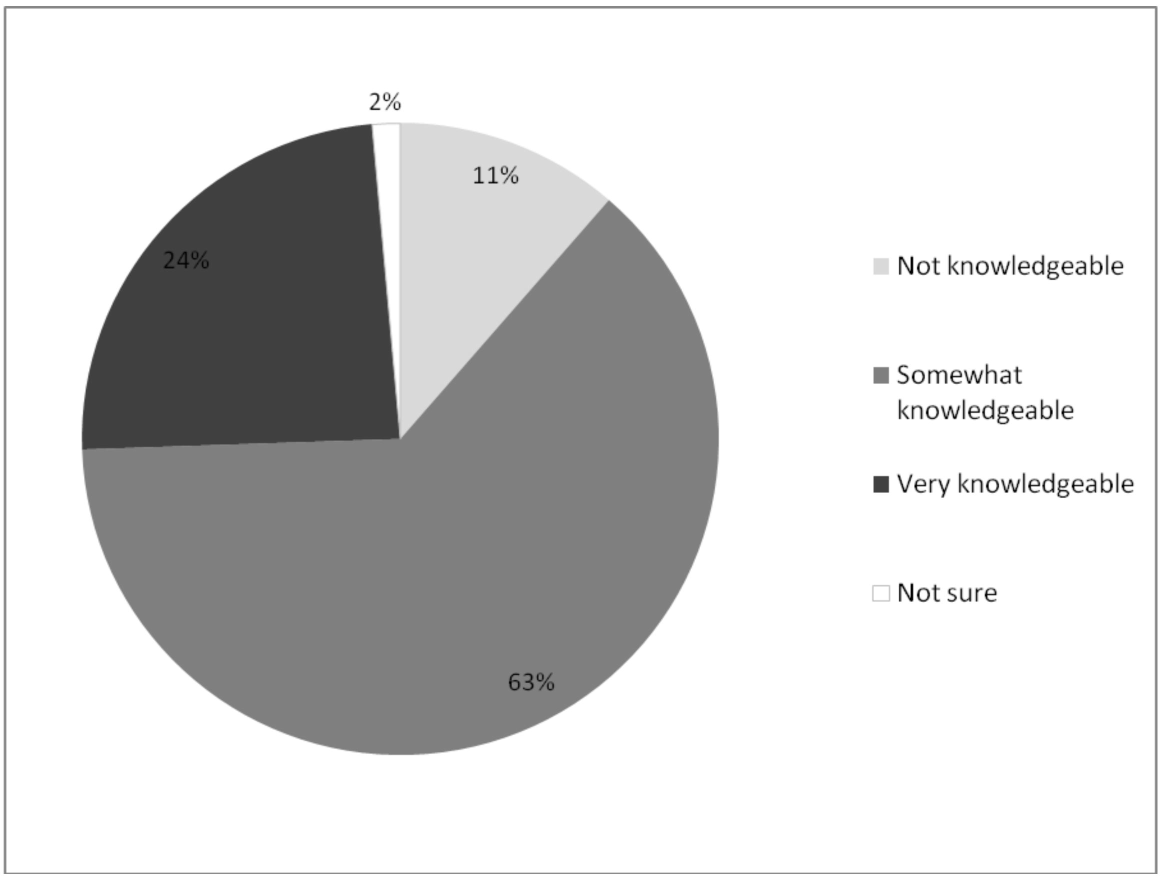

Figure 5.7. The percentage of the 146 non-East African visitors to Tanzania who participated in my 2009 survey at Kilimanjaro International Airport regarding wildlife viewing preferences that indicated not having "heard of" the listed species.

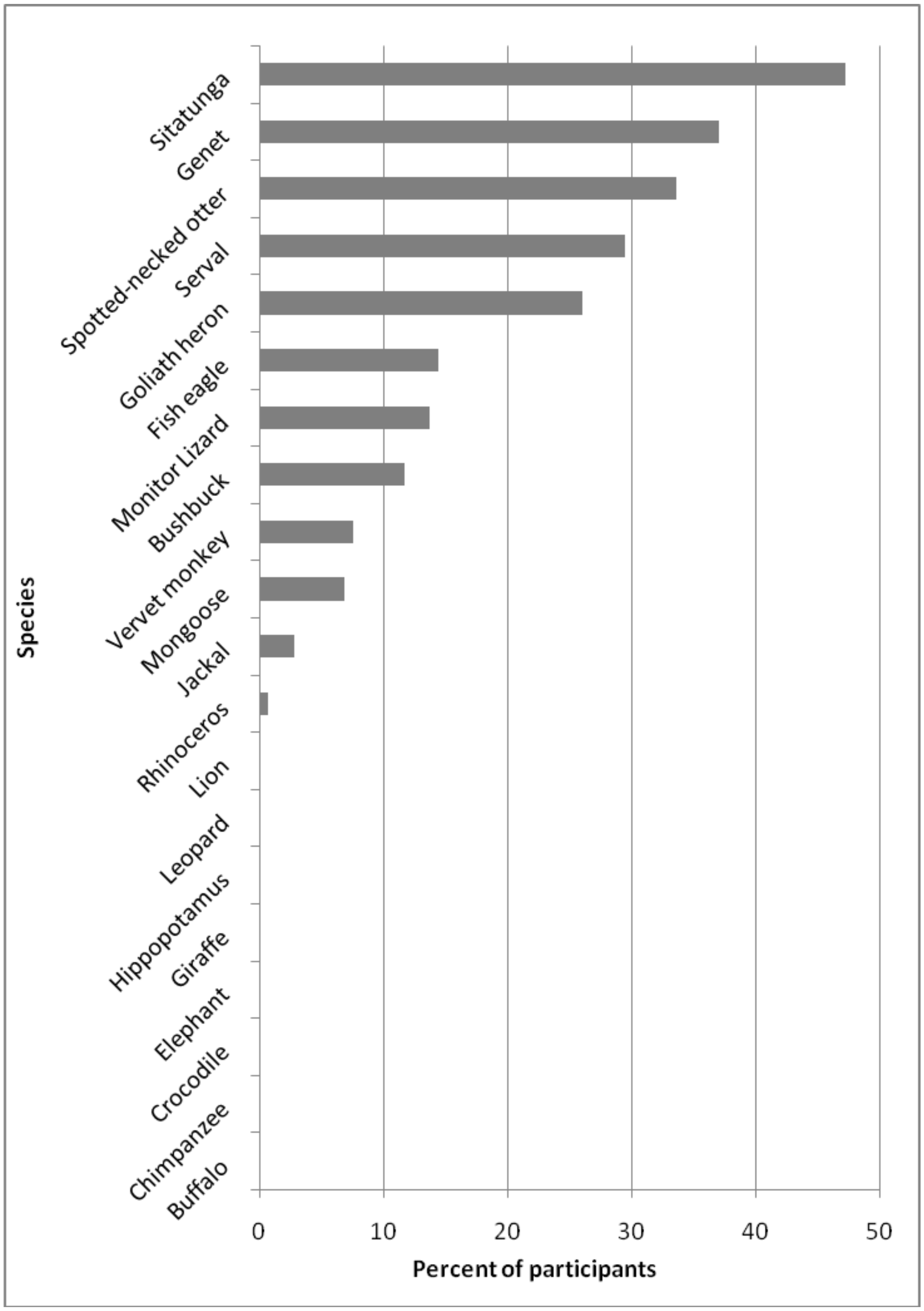

Figure 5.8. The percentage of the 146 non-East African visitors to Tanzania who participated in my 2009 survey at Kilimanjaro International Airport regarding wildlife viewing preferences indicating having "seen" (in the wild, in captivity, in photos, on television, etc.) the 7 species about which the question was asked.

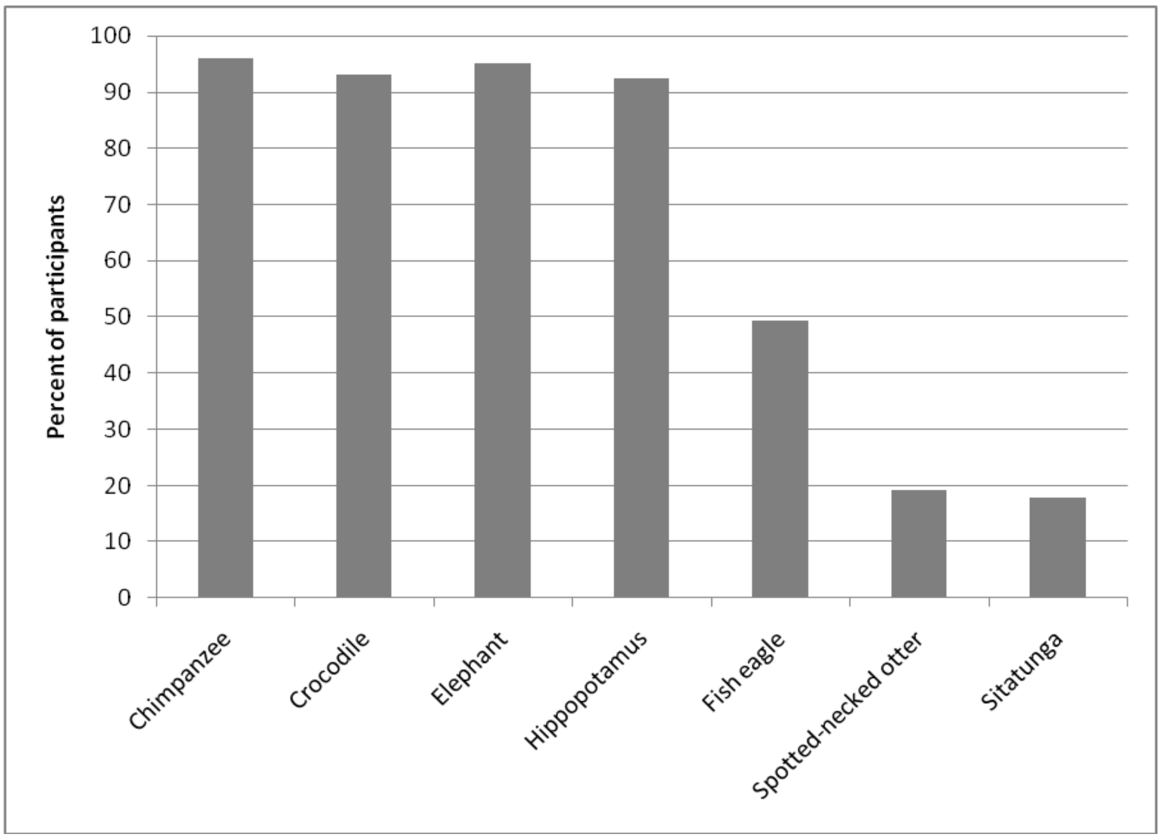

Figure 5.9. The self-reported levels of knowledge regarding 7 wildlife species of non-East African travelers at Kilimanjaro International Airport, Tanzania, that participated in my 2009 survey. Sample size for each question is included at the top of the appropriate bar.

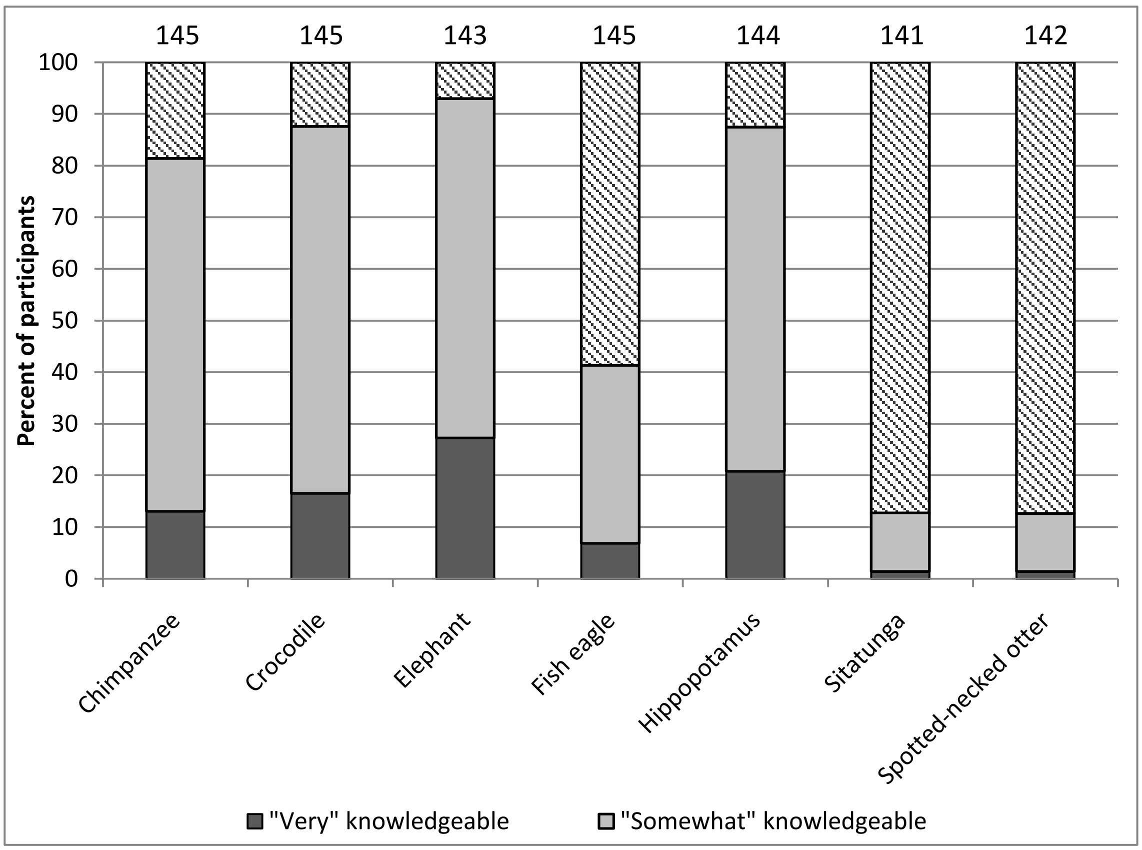

Figure 5.10. The level of interest in viewing various wildlife species expressed by non-East African visitors to Tanzania who participated in my 2009 survey at Kilimanjaro International Airport regarding wildlife viewing preferences. The number of participants providing their level of interest in viewing each animal range from 102-146, depending on the species.

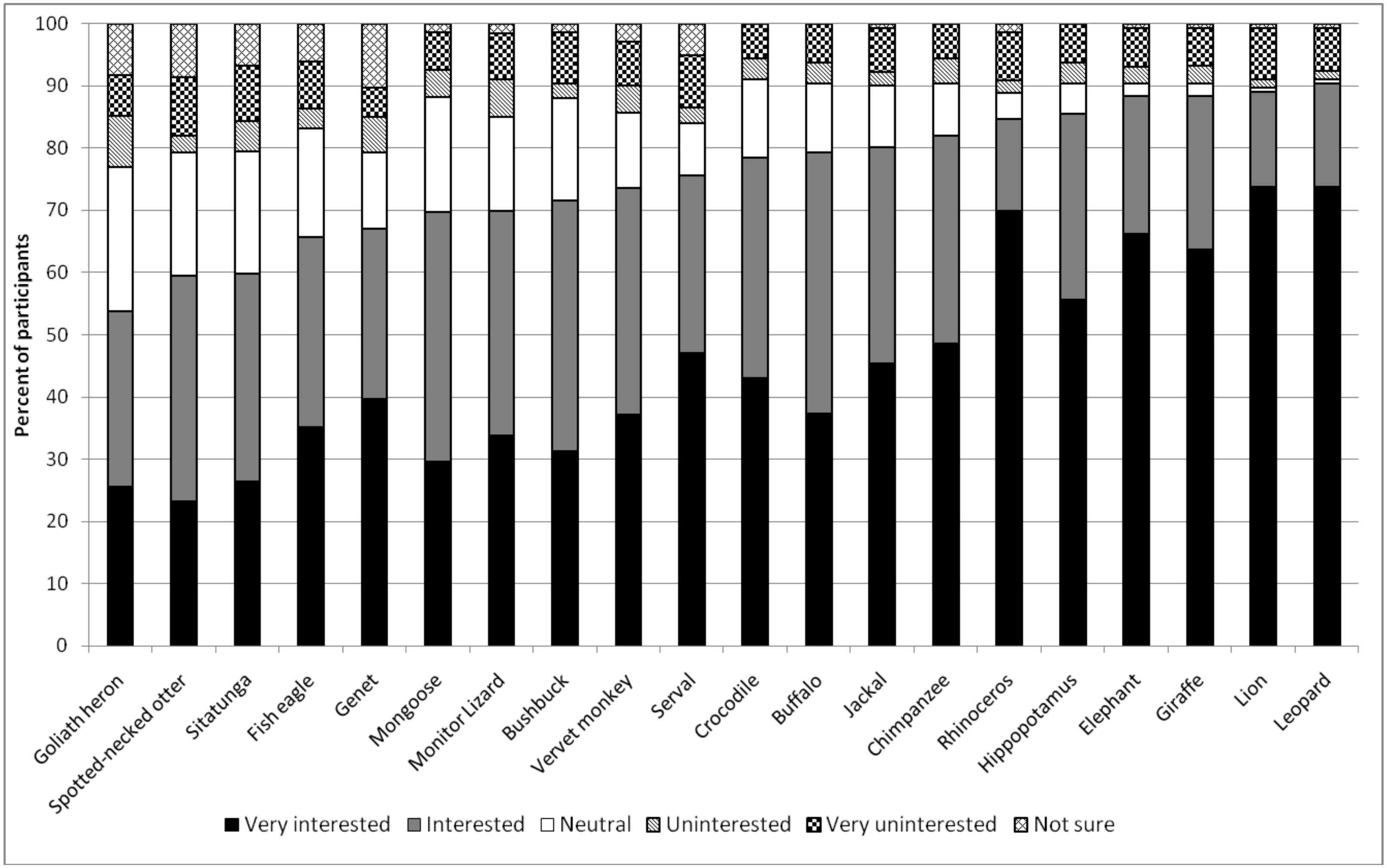

Figure 5.11. The percentage of the non-East African males and females participating in my 2009 survey at Kilimanjaro International Airport, Tanzania, who were “interested” or “very interested” in viewing various wildlife species. For males, *n* = 55-76; females, *n* = 47-70 (depending on species).

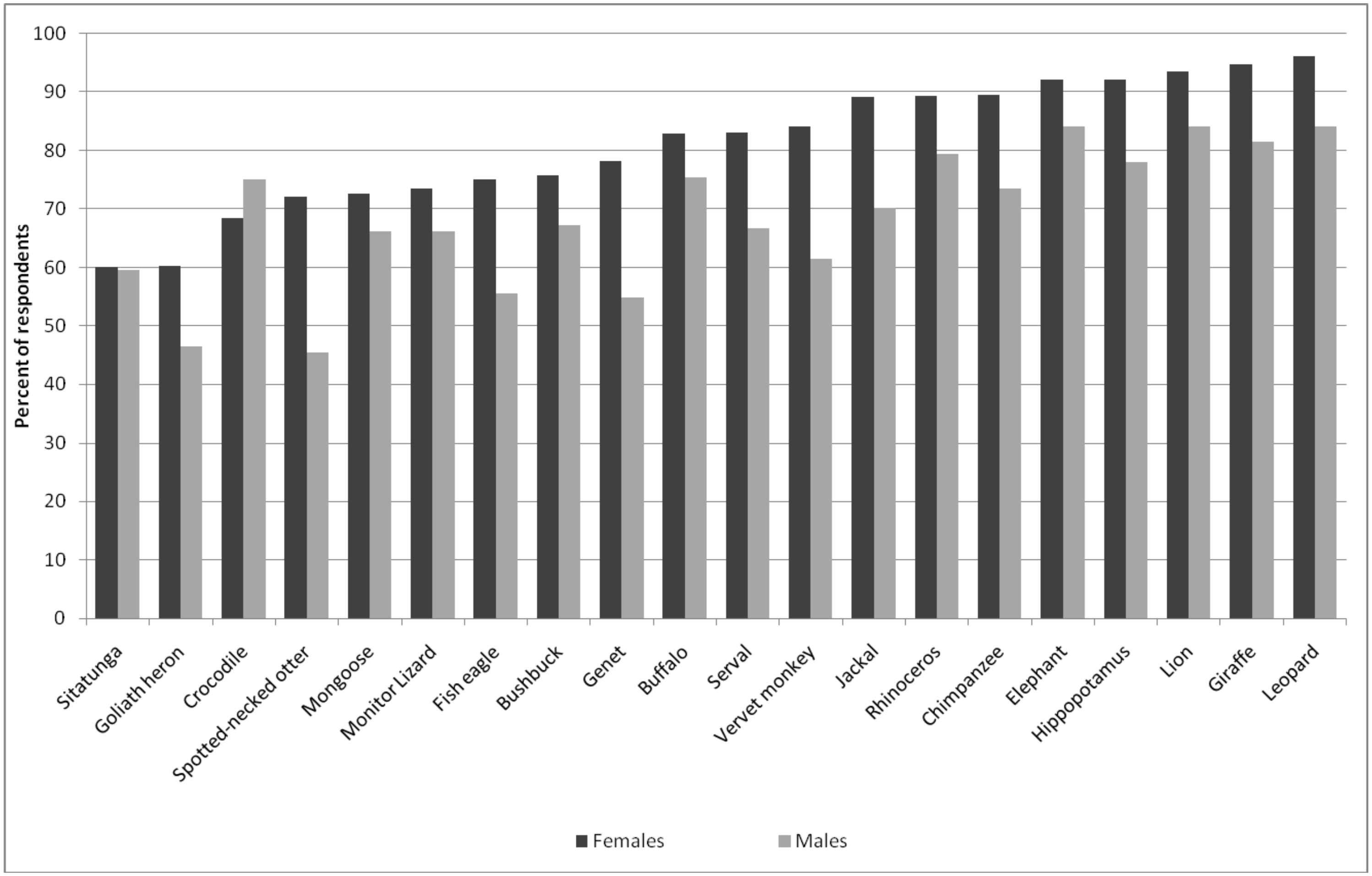

Figure 5.12. The percentage of the non-East African respondents with Bachelor's degrees and above participating in my 2009 survey at Kilimanjaro International Airport, Tanzania, who were "interested" or "very interested" in viewing various wildlife species in comparison with participants holding less than a Bachelor's degree. For those with Bachelor's degrees and above, *n* = 84-114; for those without, n = 18-32 (depending on species).

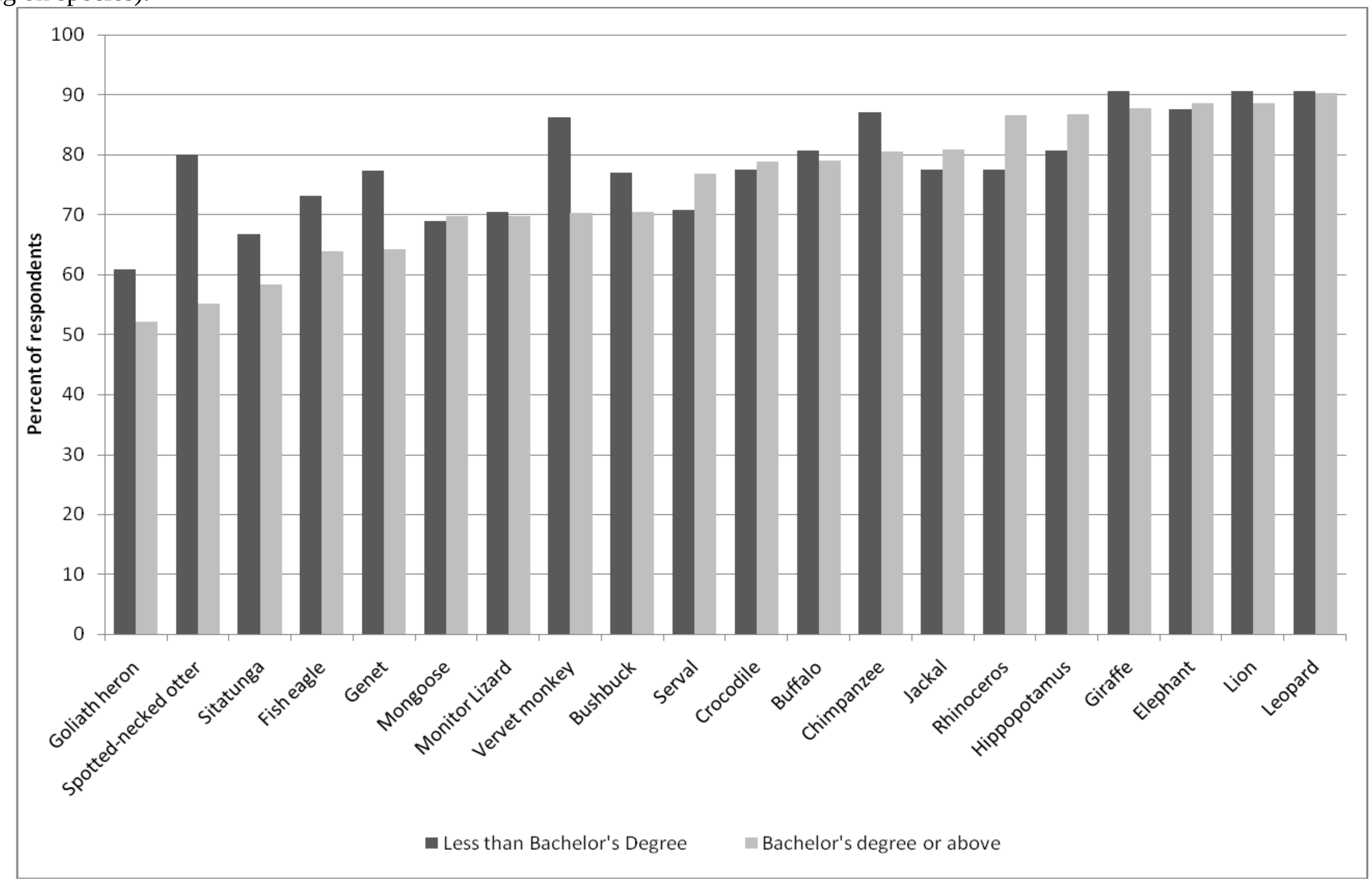

Figure 5.13. The percentage of the residents of African countries (excluding East African Community member countries) who participated in my 2009 survey at Kilimanjaro International Airport that were “interested” or “very interested” in viewing various wildlife species compared to respondents from other countries. For African residents, n = 9-13; for residents of other continents, n = 93-133 (depending on species).

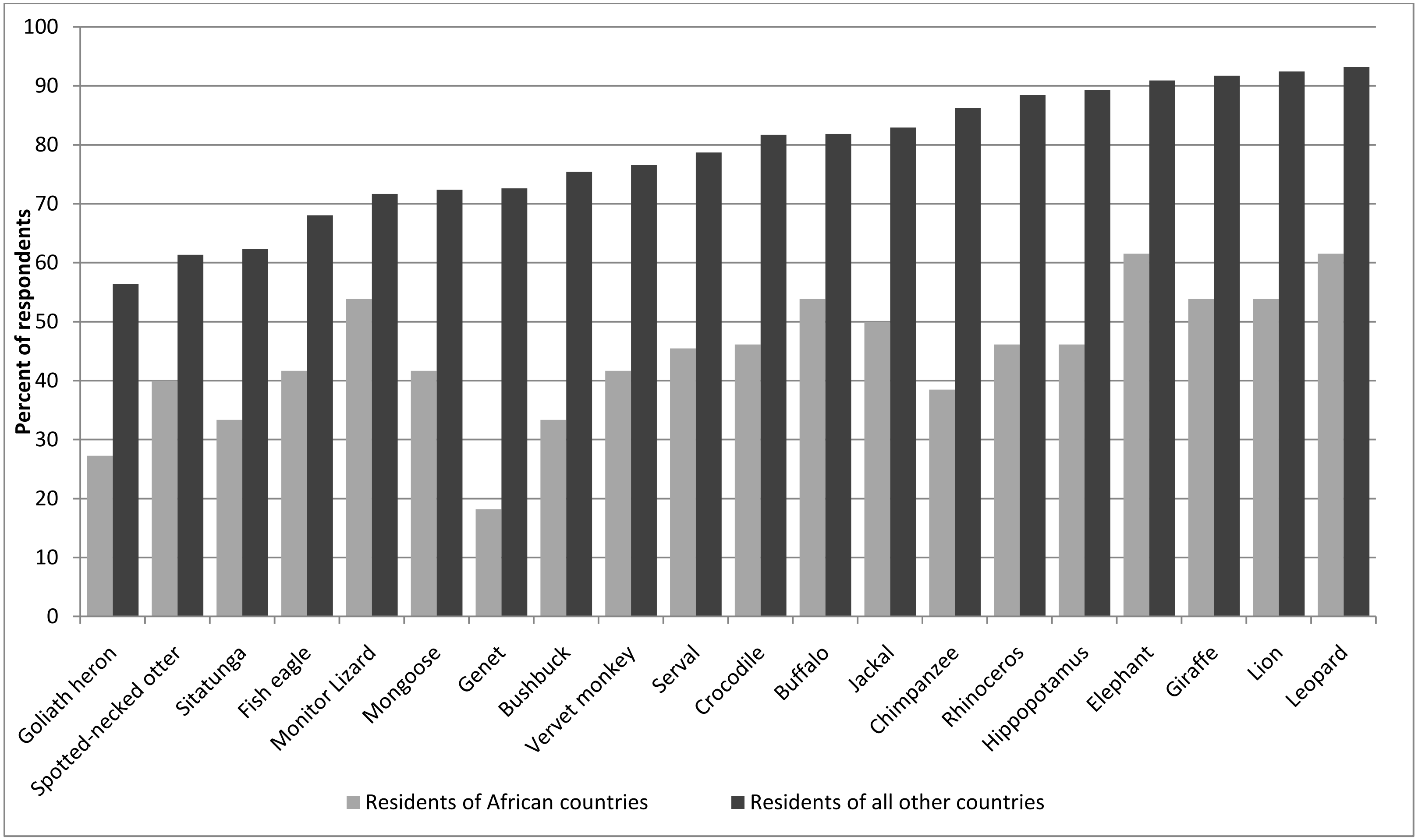

Figure 5.14. The percentage of first-time visitors to Africa who participated in my 2009 survey at Kilimanjaro International Airport that were "interested" or "very interested" in viewing various wildlife species compared to return visitors. For first-time visitors, n = 36-53; for return visitors, n = 56-75 (depending on species).

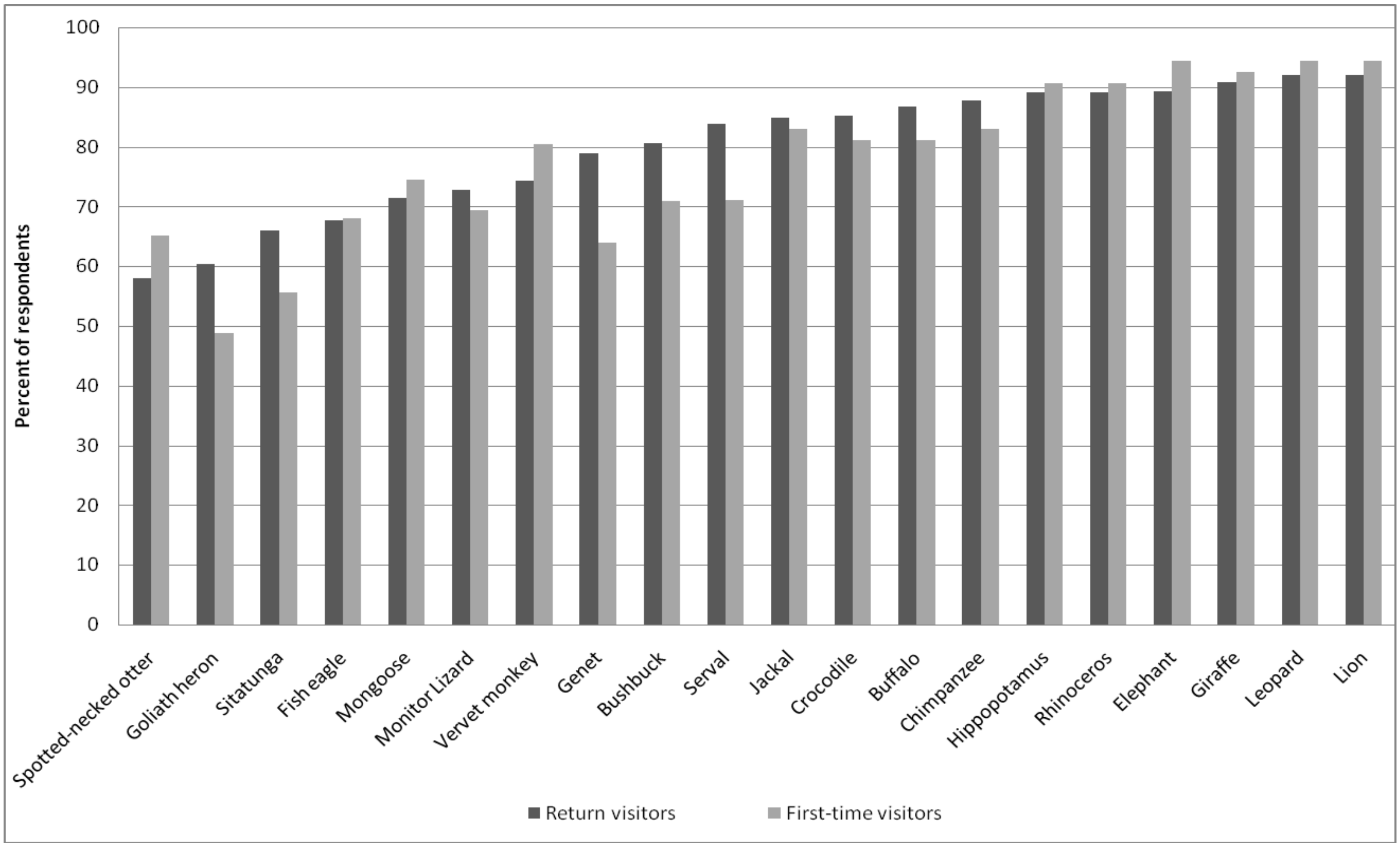

Figure 5.15. The percentage of non East-African participants in my 2009 survey at Kilimanjaro International Airport, Tanzania, that reported having gone on vacation for the primary purpose of viewing wildlife and were “interested” or “very interested” in viewing various wildlife species compared to those who had not gone on vacation for such a purpose. For those who have gone on vacation with the primary purpose of wildlife viewing, *n* = 48-70; for those who have not, *n* = 53-73 (depending on species).

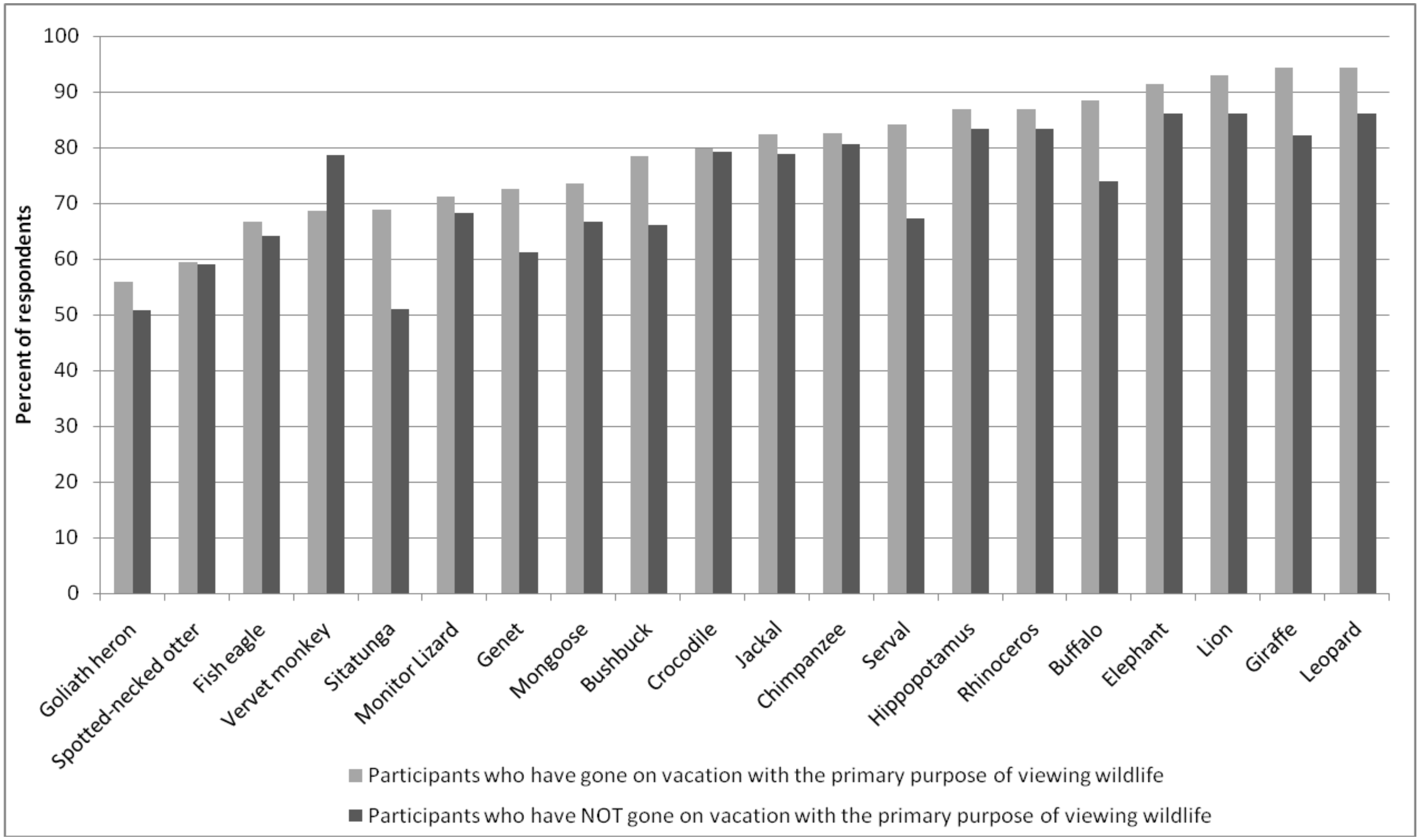

Figure 5.16. The percentage of non-East African participants in my 2009 survey at Kilimanjaro International Airport, Tanzania, that consider opportunities to view wildlife “important” or “very important” in the planning of their vacations and were “interested” or “very interested” in viewing various wildlife species compared to all other respondents (i.e., those who are neutral, consider wildlife unimportant, or are unsure). For those who consider wildlife “important” or “very important” in the planning of their vacations, *n* = 56-82; for others, *n* = 41-64 (depending on species).

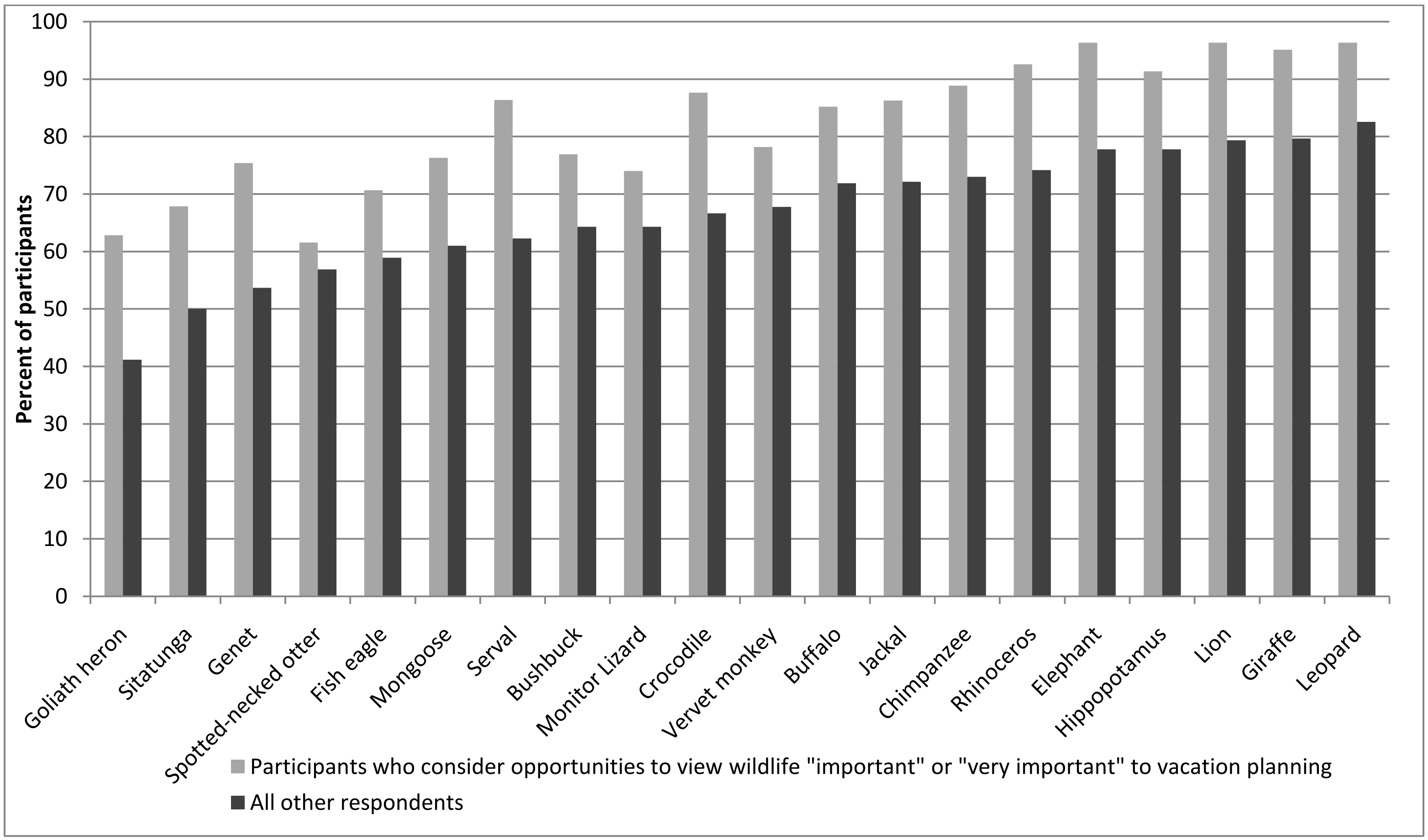

Figure 5.17. The percentage of non-East African participants in my 2009 survey at Kilimanjaro International Airport, Tanzania, that were traveling solely for pleasure and with a tour group as opposed to those traveling solely for pleasure but independently that consider opportunities to view wildlife "important" or "very important" in the planning of their vacations and were "interested" or "very interested" in viewing each wildlife species. For tour group travelers, n = 34-49; for independent travelers, n = 24-38 (depending on species).

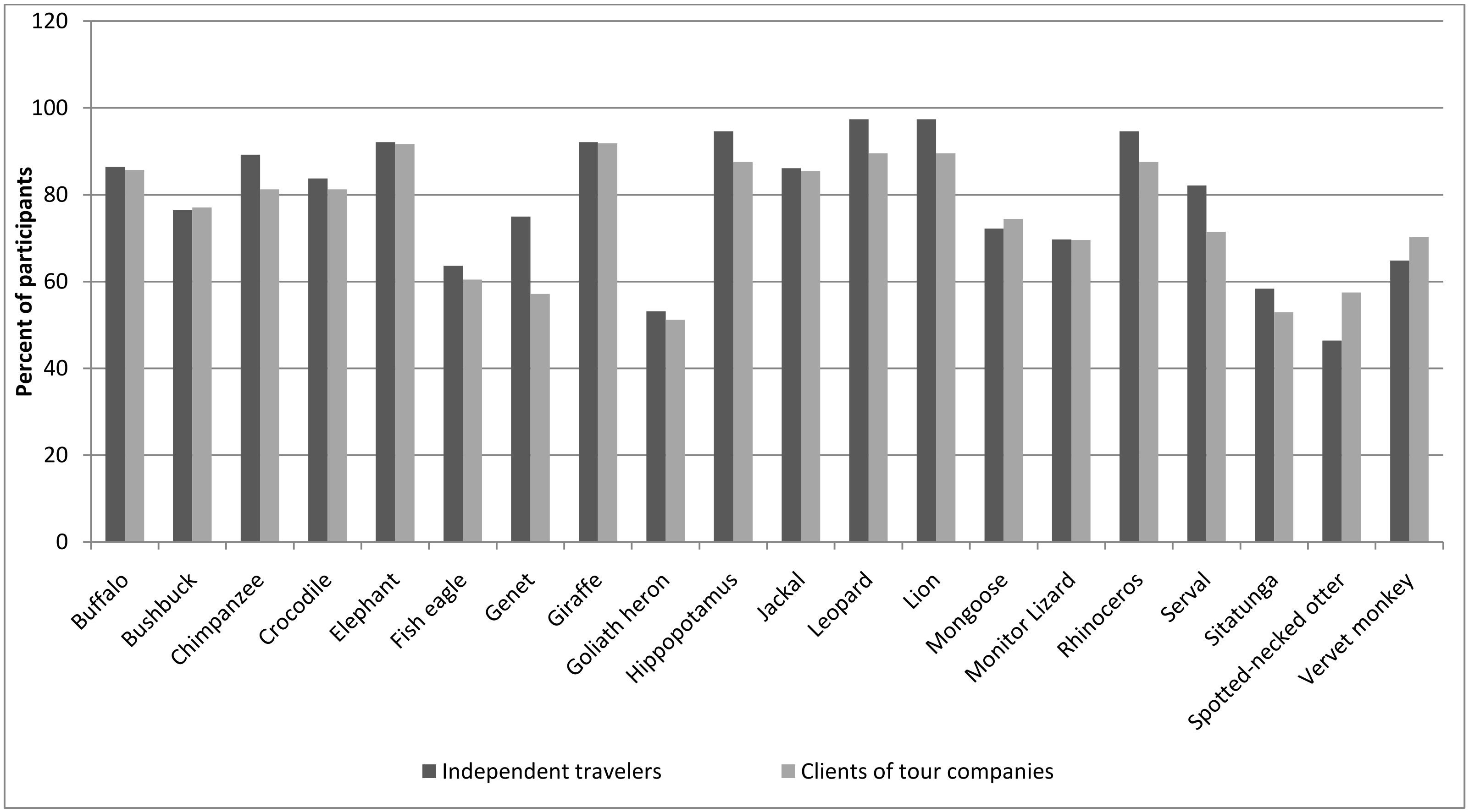

Figure 5.18. Box and whisker plots showing the distribution of rankings given to each of the species by non-East African visitors to Tanzania who participated in my 2009 survey at Kilimanjaro International Airport regarding the wildlife viewing preferences (n = 139-142).

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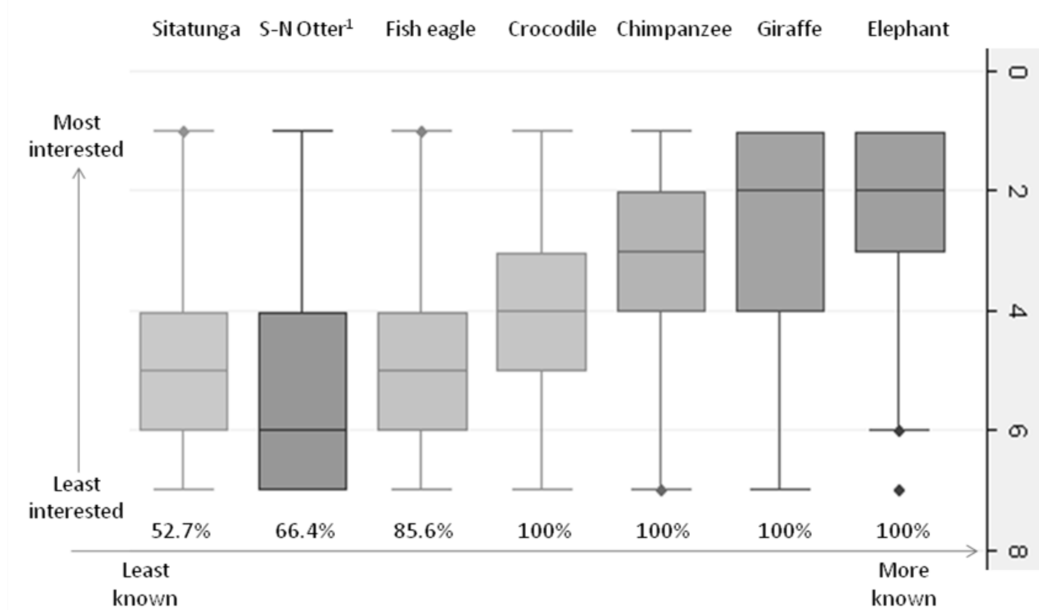


[1] Spotted-necked otter

Figure 5.19. The level of interest in viewing animals classified as "well-known" (buffalo, chimpanzee, crocodile, elephant, giraffe, hippopotamus, leopard, lion, rhinoceros, and jackal) and "little-known" (the bushbuck, fish eagle, genet, goliath heron, mongoose, monitor lizard, serval, sitatanga, spotted-necked otter, and vervet monkey) based on responses of non-East African visitors to Tanzania who participated in my 2009 survey at Kilimanjaro International Airport.

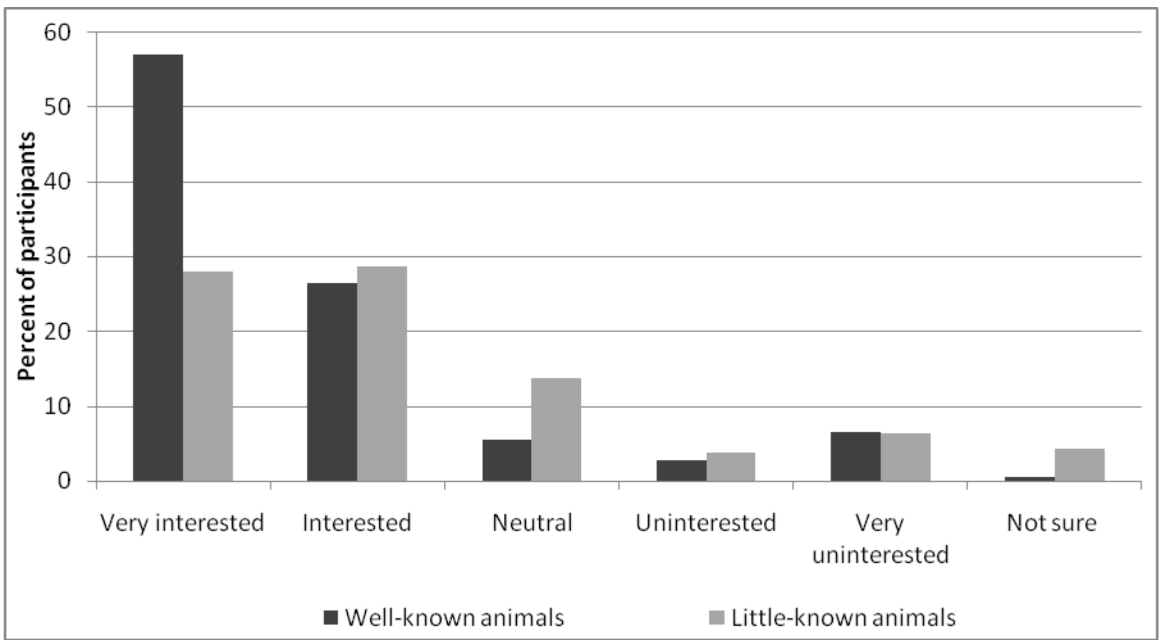
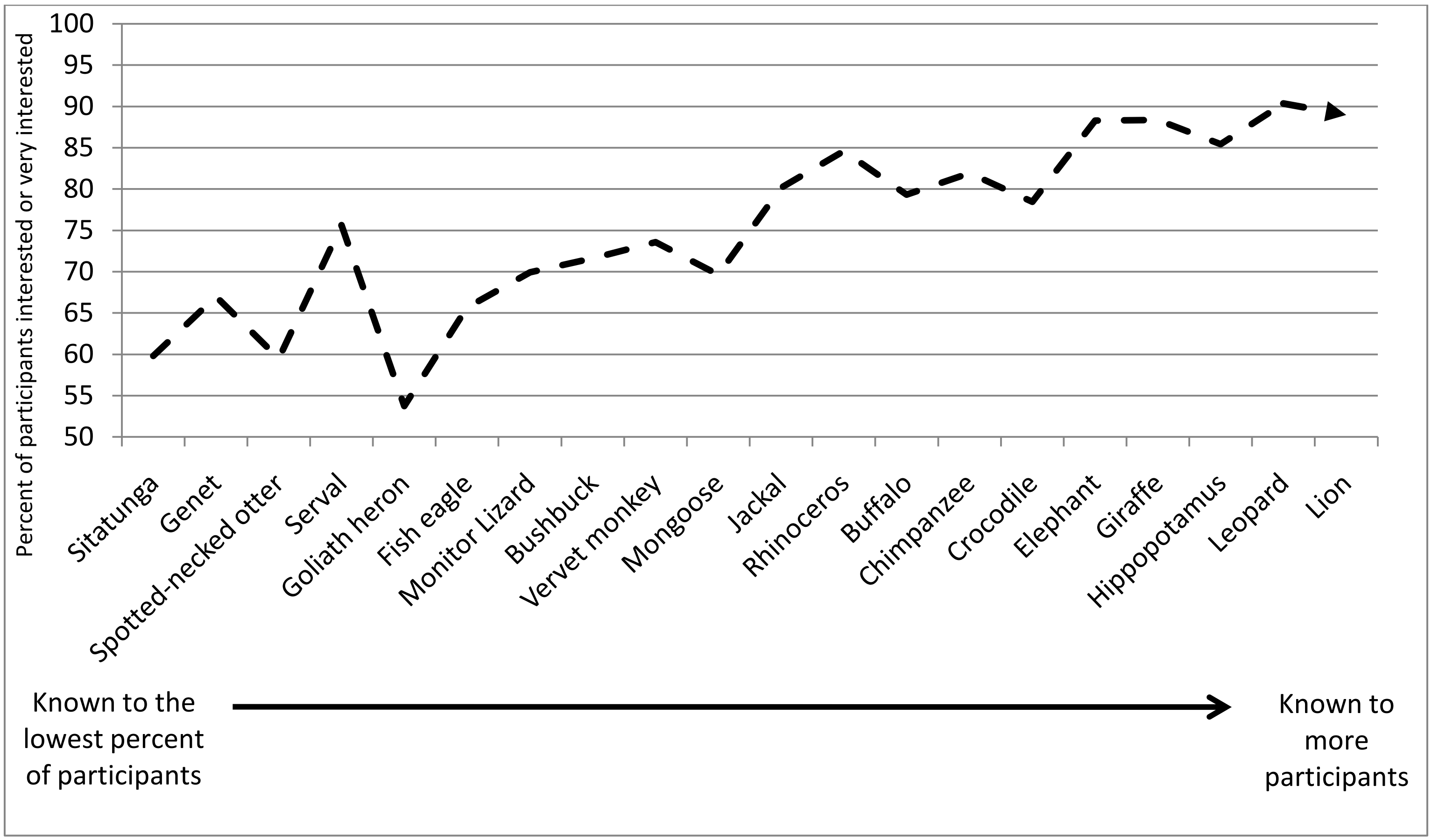


Figure 5.20. The level of interest in viewing animals included in my 2009 survey at Kilimanjaro International Airport, Tanzania, among non-East African participants arranged in order of least to most known by participants. Percentages under each animal name indicate participants who had heard of each species prior to participation in the survey. The number of participants providing their level of interest in viewing each animal range from 102-146, depending on the species.



CHAPTER 6

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The Study Area and Research

Rubondo Island is one of 16 (Caro et al. 2009) national parks in Tanzania. The Park, established fairly recently, receives limited local support and few of the international visitors (TANAPA 2003) that the managing parastatal organization (Tanzania National Parks Authority [TANAPA]) relies on for revenue generation (Bonine et al. 2004). However, increasing support for the Park from both local and international audiences is an important goal of TANAPA (TANAPA 2003). The research that informed this dissertation was intended to assist Park management in reaching that goal by investigating opinions regarding the Park and its wildlife among 3 main audiences: local people, tourists, and tour operators.

A unifying theme for much of the research discussed in the preceding chapters was that of flagship species, "popular, charismatic species that serve as symbols and rallying points to stimulate conservation awareness and action…." (Heywood 1995). Flagship species have been used around the world to gain support for conservation among both local and international audiences (for examples, see Dietz et al. 1994, Leader-Williams and Dublin 2000, and Bowen-Jones and Entwistle 2002). However, choosing an appropriate flagship species—one that will not engender ambivalence or ill-will among the target audience(s)—is not always an easy task. In choosing a flagship species, the perceptions, preferences, and attitudes of the people whose support is being sought must be considered (Dietz et al. 1994, Bowen-Jones and Entwistle 2002).

Several researchers have made suggestions about the characteristics that should be held by an effective local flagship. Bowen-Jones and Entwistle (2002), for example, suggested that the species should be: distinctive, readily associated with locally important habitats, known to the target audience, and one with which the audience has positive associations. In addition, they suggested that the species should not be one used to convey conflicting messages or those that may potentially be confused with the conservation message. Dietz et al. (1994) suggested that to be useful for engendering local support for conservation, a flagship species should be one that local residents can view and, therefore, directly relate to conservation goals. Feistner and Mallinson (2000) believed the species also should have behavioral and physical traits that endear it to the people whose support is sought. Kaltenborn et al. (2006) suggested that the best flagship species for any area would be regarded highly and not feared by the target audience.

The choice of flagship species for international audiences is typically less complex, as generally the target audiences (foreign donors, tourists, etc.) neither live near the species nor have any personal experience with the species. Often such flagship species are chosen on the basis of "intuition" (Home et al. 2009). However, for protected areas dependent on wildlife tourism for income, any flagship species should ideally serve as an attraction for tourists.

I focused my research about potential flagship species for Rubondo on investigations of preferences and opinions regarding wildlife among local people and interest in viewing various wildlife species among international visitors. In investigations of the opinions and preferences of children around Rubondo regarding wildlife, I used a survey to assess the following as a measure of flagship species potential: whether or not participants were familiar with the species (i.e., able to name the species); if participants thought the species was attractive and useful (2 things cited by others [e.g., Entwistle and Stephenson 2000, Kaltenborn et al. 2006*a*] as being important characteristics of the most favored species in Tanzania); if participants "liked" the species; and if participants wanted "many" of the species to live nearby. I also asked similar questions during interviews with adults, and although those results are not reported here they did provide insight into the reasons behind some of the perceptions of local species. To assess the interest of visitors to Tanzania in various viewing experiences, I asked travelers at the nearest Tanzanian international airport to Rubondo (Kilimanjaro International Airport) to rate and also rank their interest in viewing various wildlife species. In addition, I asked participants to indicate their awareness and knowledge about those species. My research also explored another factor important to support for national parks: local visitation. Visitation is a key component of the national park model (see Chapter 1), and is important in generating public support for those protected areas (e.g., Bushell et al. 2007). I therefore asked local children and adults participating in the surveys and interviews mentioned above if they had visited Rubondo and desired to visit. In addition, I asked adult interviewees if they knew anyone who had visited the Island. Although I did not ask any other questions specific to local tourism, interviewees regularly brought up visitation to Rubondo in response to open-ended survey questions about the Park, conservation, and wildlife tourism generally.

The Results

Children's Preferences Regarding Various Wildlife Species

Nine hundred and thirty-two primary school students in Standards 4, 5, 6, and 7 from 7 communities surrounding Rubondo completed surveys regarding wildlife preferences and opinions during 2008 and 2009. Results (reported in Chapters 2 and 3) included the following:

- Students in communities around Rubondo are least familiar with (i.e., less than 33% of students are able to name based on an illustration) the spotted-necked otter (*Lutra maculicollis*), sitatunga *(Tragelaphus speki*), large-spotted genet *(Genetta tigrina)*, and Egyptian goose (*Alopochen aegyptiacus*); fairly familiar with (44 - 62% are able to name) the fish eagle (*Haliaeetus vocifer*) and little egret (*Egretta garzetta*); and quite familiar with (>79% are able to name) the hippopotamus (*Hippopotamus amphibius*), silver cyprinid (*Rastrineobola argentea*), monitor lizard (*Varanus niloticus*), vervet monkey (*Cercopithecus pygerythrus*), crocodile (*Crocodylus niloticus*), giraffe (*Giraffa camelopardalis*), and elephant (*Loxodanta africana*).
- Animals considered most attractive by students were not always the type typically preferred in other areas (e.g., the “cute” or “athletic” species preferred by children in the USA and the United Kingdom [Kellert and Westervelt 1983, Entwistle and Stephenson

2000]). The Egyptian goose was considered the most attractive by students able to name the species (with 88% finding the species attractive), followed by the silver cyprinid (86%), giraffe (84%), and little egret (83%). Less than 50% of students considered the crocodile, monitor lizard, or large-spotted genet attractive.

- Over 80% of students able to name them considered the silver cyprinid and Egyptian goose useful. Less than 50% considered the crocodile, genet, monitor lizard, and vervet monkey useful.
- The students showed little affinity for or desire to live “near” large-spotted genets, monitor lizards, spotted-necked otters, vervet monkeys, crocodiles, and hippopotamuses; some affinity for and desire to live near giraffes, elephants, fish eagles, and sitatunga; and high affinity for and desire to live near Egyptian geese, silver cyprinids, and little egrets.
- Animals that a high percentage of students wanted to be locally abundant were also generally considered attractive and useful, and were well-liked, although participants did not always want to live near species that were generally well-liked and considered attractive and useful.
- The only species that received high scores on all measures used to assess flagship species potential (familiarity, attractiveness, usefulness, liking, and desirability) was the silver cyprinid. However, familiarity was the only category in which the Egyptian goose did not receive a score of “high.”
- All of the demographic variables I measured except having a head of household (HOH) involved in farming (i.e., school, standard [grade], gender, having a HOH in livestock keeping and having a HOH in fishing) explained some variation in students’ ability to name at least 1 species.

- No variables appeared to be useful in explaining “dislike” for sitatunga, Egyptian geese, elephants, and giraffes, nor preferences for “few” crocodiles, Egyptian geese, and little egrets.
- For all other cases, “dislike” and preferences for “few” of a species were explained in part by at least 1 of the measured demographic variables (school, standard [grade], gender, and having a HOH in livestock keeping, in fishing, or in farming).
- Among the species determined to have the highest potential to serve as effective local flagships based on general attractiveness, usefulness, likeability, desirability, and status as native to the area—i.e., the fish eagle, sitatunga, little egret, Egyptian goose, and silver cyprinid—the measured variables appeared useful in describing either “disliking” or wanting “few” of all but the Egyptian goose. Children’s standard and school appear to influence their “dislike” for the fish eagle, and males are apparently more likely to want “few” of the species. No variables were useful in describing “dislike” for the sitatunga, but males were more likely to want “few” of the species. Children with fishing HOHs were more likely to “dislike” the silver cyprinid than other children. Males also were more likely to want “few” silver cyprinids. No variables appeared to be useful in explaining wanting “few” of the little egret, and only the variable “standard” appeared to influence “dislike” for the species.

Visitors’ Interest in Viewing Various Wildlife Species

One hundred and forty-six non-East African travelers participated in interviews at Tanzania’s Kilimanjaro International Airport in 2009. Findings (reported in Chapter 5) included the following:

- All participants had “heard of” the buffalo (*Syncerus caffer)*, chimpanzee (*Pan troglodytes*), crocodile, elephant, giraffe, hippopotamus, leopard (*Panthera pardus*) and lion (*Panthera leo*); all but 1 had “heard of” the rhinoceros (*Diceros bicornis*), and all but

4 the jackal (*Canis mesomelas*). More than 10 participants (6.8%) had not "heard of" the remaining 10 species—the bushbuck, fish eagle, genet, goliath heron (*Ardea goliath*), mongoose (*Mungos mungo*), monitor lizard, serval (*Felis serval*), sitatunga, spotted-necked otter, and vervet monkey.

- The least known species were the: sitatunga (which 47.3% of participants had not "heard of"), genet (37.0%), spotted-necked otter (33.6%), serval (29.5%), and goliath heron (26.0%).
- Participants indicated a fairly high level of interest in seeing all species included in the survey; none were of viewing interest to less than 50% of participants.
- Over 75% of participants were "interested" or "very interested" in seeing the leopard, lion, giraffe, elephant, hippopotamus, rhinoceros, chimpanzee, jackal, buffalo, crocodile, and serval.
- The lion and leopard tied as the species the greatest percentage of participants were "very interested" in seeing.
- Participants who were residents of African countries were less interested in viewing most species.
- All "well-known" species (leopard, lion, giraffe, elephant, hippopotamus, rhinoceros, chimpanzee, jackal, buffalo, and crocodile) were considered "interesting" or "very interesting" to greater proportions of participants than "little-known" species.
- The percentage of participants "neutral" or "not sure" about their interest in viewing a species were generally greater for "little-known" species and interest generally increased (with a few exceptions) as the number of participants who had "heard of" the species increased. However, the respondents who had "heard of" a least-known species were no more or less likely to be "interested" or "very interested" in viewing the species than respondents who had not "heard of" the species.

Local Visitation of Rubondo

Forty-eight adults in the communities of Nkome and Muganza participated in interviews during 2008. In addition to responses to specific questions about previous visitation to Rubondo and interest in visiting in the future, participants often offered information relevant to local tourism in response to open-ended questions about conservation, wildlife tourism, and national parks. Results from those interviews and from questions regarding visitation to the Park in the survey of school children (reported in Chapter 4) include the following:

- Ninety percent of children and 83% of adult participants had not visited Rubondo, although 92% of children and 98% of adults desired to visit.
- Most adult participants (71%) did not know anyone who had visited the Park.
- Adult participants indicated that lack of information was a major barrier to visitation.
- Cost also was mentioned as a barrier to visiting Rubondo, although to a lesser extent than lack of information.
- Seven interviewees who showed ambivalence to conservation, wildlife tourism generally, or Rubondo cited not having visited the Park as a reason, as did 4 others whose responses were more negative.
- In contrast, 9 participants saw value in protecting wildlife and the places they live or wildlife tourism on Rubondo because of the potential for themselves or their children to visit the Park and/or learn about the environment.
- Adult participants associated visiting the Park with opportunities for themselves and others to learn about the environment.
- Several respondents held or alluded to the misconception that tourists or researchers who visit Tanzanian parks take minerals, and others mentioned fear of being shot if they tried to enter Rubondo without complete understanding of the proper procedures.

Recommendations from Previous Chapters

The choice of flagship species is complicated and multi-faceted, and the effectiveness of using such a technique depends not only on the species used, but also on other components of the relationship between the protected area and local people and, for an international tourism flagship, the uniqueness of the experience. Based on the results of the various investigations reported here, I made the following suggestions and observations for Rubondo in individual chapters:

Local Flagship Species and Local Support

- I suggested that among the species included in the survey, the Egyptian goose and silver cyprinid possibly have the most potential for immediate use as local flagships for Rubondo based on the characteristics evaluated. However, because those species likely would not serve the dual role of tourism flagships, I noted that Park management may want to consider the sitatunga and fish eagle (which are expected to be more useful as international flagships based on uniqueness to Rubondo) as well. Before using either of those species, however, I suggested based on my interpretation of models that further assessments of perceptions of the species among certain demographic groups would be wise. In addition, to use either the sitatunga or fish eagle as a flagship, Park management would likely need to invest in an outreach campaign that would heighten awareness of the species.
- I indicated that some species (including the elephant and giraffe) that scored reasonably well based on the familiarity and opinion indicators used to assess flagship potential are probably poor choices for flagship species for Rubondo because they are not native to the Island.
- I noted that inviting nearby communities to “elect” a local flagship, or even a suite of flagships, for the Park—ideally from among a selection of species generally considered useful, attractive, likeable, and desirable locally, and that Rubondo’s management feel

best highlight the Park's most important conservation needs—is one way that Park management could increase local involvement in, and, consequently, likely support for the Park.

- I suggested that Park management should take immediate steps to increase local visitation to Rubondo by providing information regarding procedures for visiting (e.g., appropriate entry points) through multiple formal and informal avenues. I proposed the following as possible additional steps to take: establishing and highly advertising a free visit day each year for local people (possibly in conjunction with discounted accommodations); more clearly demarcating entry points into the Park; working within local communities to establish and advertise a network of boat owners willing and able to provide locally-affordable transportation to the Island; continuing to seek grant funding for bringing school children, and perhaps in the future even adults, to the Island; and setting up a fund that international visitors could contribute to for the same purpose.

International Support Through Tourism

- I suggested the spotted-necked otter, sitatunga, and fish eagle as probably the most potentially appealing viewing experiences for native species on Rubondo that are not available in more readily-accessible areas. Although none of the 3 species were among the most interest to visitors that participated in my survey, all species I asked about garnered fairly high levels of interest.
- I noted that by supplying information about little-known species such as the spotted-necked otter, sitatunga, and fish eagle, managers could possibly entice potential visitors to travel to Rubondo to see them. However, I suggested that a likely more feasible alternative might be to focus marketing strategies on tourist segments that would already be particularly interested in viewing opportunities for those species (e.g., for the otter and sitatunga, members of their respective IUCN SSC Specialist Groups).

- In addition, I proposed that Rubondo may want to consider other wildlife and nature viewing opportunities that I did not measure interest levels in, such as its >200 bird species and diversity of orchid (family Orchidaceae) and butterfly (order Lepidoptera) species that are also likely of interest to specific market segments.
- I indicated that Park management might want to consider how wildlife could be advertised not as flagships for a wildlife tourism destination, but instead to add value to other types of tourism experiences. For example, Rubondo could target travelers interested in the island environment (including the sandy beaches, which 35% of European tourists seek in combination with a safari—Wade et al. 2001), using a suite of species related to the aquatic environment, such as fish eagles, spotted-necked otters, sitatunga, hippopotamuses, and kingfishers (family Alcedinidae), to add value to that setting. Rubondo's managers may alternatively find that the best option is advertising the Park as a destination for people interested in outdoor adventures or as a "classroom" for field courses.
- I emphasized the importance of considering how any choice of an international flagship species would affect local perceptions of Rubondo.
- In addition, I suggested that an important immediate next step in designing a marketing strategy for Rubondo would be to determine tour operators' and Park visitors' perceptions of the Park's best features.

Putting it all Together - Conclusions and Recommendations

The chapters of this dissertation explored several different aspects of increasing support for Rubondo. Surveys and interviews revealed that support for the Park in nearby communities may be increased by promoting and enabling local visitation to the Park. Investigations of local preferences and opinions suggested that 2 species that might be the best flagships for immediate local use are the silver cyprinid and Egyptian goose. Results from investigations of potential international flagships led me to conclude that the Park's native species may not have immediate potential to entice visitors from other countries to visit the Park.

None of the species for which I measured interest and preferences appeared to be an ideal flagship for both local and international audiences. The species with the most immediate local promise based on the criteria used have little potential as an international wildlife viewing attraction; using such species as flagships could help create and perpetuate an internationally unappealing image for the Park. The species on Rubondo included in my survey of visitors to Tanzania that were most popular are introduced to the Island and I therefore consider them questionable flagships for a national park. The 2 native species that produced the most interest among participating visitors to Tanzania (the crocodile and hippopotamus) are feared and undesired locally (see Chapters 2 and 3); using those species as flagship for the Park could lead to negative local perceptions of the Park. Managers of Rubondo might be wise to consider other species I did not assess as flagships or how wildlife could be used in other strategies for gaining support for the Park (e.g., by highlighting ecosystem services the Park provides to local communities, or to add value to the Park as an adventure or beach destination [although practical issues like water quality may be problematic for the latter]).

Because opportunities to view wildlife are of primary interest and importance to visitors to Africa (Goodwin and Leader-Williams 2000, Okello 2005, Mladenov et al. 2007) and marketing of the continent's national parks generally focuses on wildlife viewing opportunities (e.g., Goodwin and Leader-Williams 2000, Okello et al. 2008), the assessments of tourist interest included in this dissertation focused on the potential of various wildlife species on the Island to serve as tourism flagships for Rubondo. However, tourists also are interested in a variety of experiences besides wildlife viewing. National parks in other countries created around and famous for unique geological or environmental features attract millions of visitors each year (e.g., Grand Canyon, Yosemite, and Zion National Parks, which were among the top 10 most visited National Parks in the USA in 2010—Sheail 2010, NPCA 2011). Those marketing Rubondo may want to deviate from typical approaches for Tanzania's National Parks that appear to focus on wildlife viewing opportunities and instead focus their efforts on highlighting the Park's island environment. Rubondo is a beautiful and serene setting, the only protected area in Lake Victoria and, with the exception of Serengeti National Park, the only area of Tanzania with lowland Congolese tropical primary forest (TANAPA 2003). Perhaps what tourists would find most appealing about Rubondo is this unique setting. Wildlife may best be advertised as adding value to a tropical island in a world-famous lake, not as serving the star attraction.

Finally, the currently limited support coming from tourism and reportedly limited local support for the Park do raise questions about the effectiveness of the national park model (i.e., dependence on tourism and regulations prohibiting resource extraction) for a location like Rubondo. Prior to any such discussion, an understanding of the types of land protection in Tanzania is important. As outlined in Chapter 1, national parks in Tanzania have the most protection of any other area. I suggest that the prevalence of poaching in Rubondo's waters (TANAPA 2003, personal observations) in combination with the degraded state of Lake Victoria fisheries (see Appendix A) and shorelines, makes any move that would weaken protection of the land and water currently contained in the Park, particularly the only protected fish breeding grounds in Tanzanian Lake Victoria, imprudent. Losing the fish breeding grounds would have unknown, but potentially disastrous consequences for the communities surrounding Rubondo, and, because of the importance of Lake Victoria's fish as a protein source within other areas of the country and as an export (e.g., RWG-Monitoring Control and Surveillance 2005, Luilo 2008), perhaps even national effects. Although certainly there are many forms of effective community-regulated natural resource management (e.g., lobster trapping in Maine, USA—Acheson 2006), any sanctions prohibiting behaviors harmful to natural resources that were imposed by previous inhabitants of the Island have been eliminated. And although harvest can clearly be done sustainably, other types of protected areas do not receive the attention needed to enforce the regulations that would be needed for sustainability. Also, with harvest, the amount of fish recruiting to other areas could decrease. Consequently, I believe any decrease in regulations now, given the local situation, would lead to, at least in the short-term, a "tragedy of the commons" (Hardin 1968) of great proportions. Creating a national park is a long-term commitment. Although some members of the conservation community are asking what I believe are important questions about how parks are created and interact with nearby communities (e.g., Duffy 2010, Mcshane et al. 2011, Miller et al. 2011, Sarkar and Montoya 2011), I also do not believe we should give up on young parks that are already established, even if they must be accepted as a "losing" proposition financially and even if local support is not currently overwhelming. Many national parks in prosperous countries had similar problems of local support early in their history (e.g., Jacoby 2003), but now receive high levels of public support (Terborgh and Van Shaik 2002).

Perhaps more importantly, I believe that any discussions of the appropriateness of Rubondo as a national park are premature. Not long ago, tourism was greater on Rubondo and generally steady (Steria Ndaga, Rubondo Island National Park, personal communication). Although the decline in visitation to Rubondo may be partially that felt by many in Tanzania's tourism industry in recent years (e.g., tour operators—S. S. S., unpublished data), it has also been heavily influenced by changes in ownership of the Island's tented camp, particularly a period of vacancy (Steria Ndaga, Rubondo Island National Park, personal communication). As is typical (D. E. Rwehimbuza, TANAPA, personal communication), the owners of the camp play an important role in advertising the Park and attracting tourists (Steria Ndaga, Rubondo Island National Park, personal communication). The former tented camp owner had worked with Rubondo staff and an airline to alleviate transportation challenges by arranging regularly scheduled flights to the Island. However, when tourism declined offering these flights became a loss to the airline and they were cancelled, leaving Rubondo in the current position of low tourism and limited transportation options.

Rubondo's landscapes, wildlife species, and cultural sites are of considerable local, national, and international value as a national park. By appropriately marketing the Park both locally and internationally, and increasing the benefits local communities receive from the Park by removing perceived barriers to visitation, managers can help ensure the future of the resources contained by the Park. A variety of people and organizations have a stake in Rubondo's future, including residents of nearby communities, members of the tourism industry, Park and TANAPA staff, the Frankfurt Zoological Society, and visitors. Practical next steps in formulating a marketing strategy for Rubondo may include further investigation of tour operators' perceptions of the Park and visitors' opinions about its most enticing features, and bringing together Park stakeholders to discuss those results, the information contained here, and the implications of both for increasing support for Rubondo.

APPENDIX A

THE CONSERVATION STATUS AND FISHERY OF LAKE VICTORIA

Lake Victoria is the largest lake in Africa and, by area (68,800 km^2), the largest tropical lake in the world (Ogwang et al. 2005, Luilo 2008). Although large in area, the Lake is shallow, with an average depth of 40 m and a maximum depth of 60 m (Luilo 2008). The Lake's waters are shared by Kenya (43%), Tanzania (51%), and Uganda (6%) (Odada et al. 2004, Ogwang et al. 2005, Luilo 2008), and the Lake's catchment is also shared by Burundi and Rwanda (Odada et al. 2004, Luilo 2008). However, because Lake Victoria is the source of the Nile River, the health of the lake is of interest to many other countries as well, including Egypt and Sudan (Odada et al. 2004, Luilo 2008, Matshanda 2008).

In 2000, the Lake Victoria basin was estimated to have a population of 30 million people with an annual growth rate of 3% (Awange and Ong'ong'a 2006). The dense population lives in extreme poverty and relies heavily on fishing and subsistence farming, which is supported by water from the Lake (Odada et al. 2004, Ogwang et al. 2005). Lake Victoria is said to be the most productive lake fishery in the world (Owange et al. 2005), producing 350,000 metric tons of fish per year and having an annual gross economic product of 3-4 million USD (RWG-Monitoring Control and Surveillance 2005). The Lake is the major source of fish landed in the bordering countries (Luilo 2008), and employs 3 to 4 million people (LVFO 2006*a*), 175,000 of which are full-time fishers (Ogwang et al. 2005). The Lake also meets the annual fish consumption needs of almost 22 million people in surrounding regions (LVFO 2006*e*). Lake Victoria also is used as a supply of water, for hydroelectric power generation, for transportation, and as a dumping grounds for often-untreated industrial and municipal wastes (Ogwang et al. 2005, LVFO 2006*d*, Richard 2006, Luilo 2008). These factors, in combination, place a great deal of pressure on the Lake's environment.

The Lake Victoria fishery has gained fame since the 1950's introduction of Nile perch (*Lates niloticus*—a voracious predator) led to a drastic change in the fishery, including the extinction of many native fish species (LVFO 2005, Shoko et al. 2005, Goudswaard et al. 2008). Subsequent increases in Nile perch catches led to a boom in the Nile perch fishery (Shoko et al. 2005). The boom in the fishery resulted in investment in a Nile perch export industry and a loss of local management control by fishing communities (RWG-Monitoring Control and Surveillance 2005). The Nile perch fishery also attracted more fishers with greater amounts of more sophisticated fishing gear and vessels, and led to the establishment of fish filleting factories (Odada et al. 2004). Many people moved to the area to engage in what appeared to be a lucrative profession, an influx speculated to have forced traditional fishers to resort to the use of destructive fishing methods to sustain their level of livelihood and food requirements (Odada et al. 2004). The Nile perch quickly became the focus of a huge market of worldwide significance (Odada et al. 2004). The once-diverse subsistence fishery of the Lake is now dominated by market-oriented exploitation of Nile perch, as well as Nile tilapia (*Oreochromis niloticus*—another introduced species) and silver cyprinid (*Rastrineobola argentea*) (Odada et al. 2004, Luilo 2008). The number of fishers has increased dramatically while concurrently the size of fish caught and catch-per-unit-effort has declined (Odada et al. 2004, LVFO 2005, Mulisa 2008). A recent census showed that between 2002 and 2006, fishers increased from 129,000 to 196,000, fishing crafts from 42,000 to 69,000, gillnets from 650,000 to 1.2 million, and hooks from 3.5 to 9 million (LVFO 2006*b*). The increase in the hook fishery has also led to an increased need for bait, especially the live fish preferred by Nile perch, which is generally collected from the Lake using small mesh size gill nets, traps and seine nets—all of which threaten other species and their breeding areas (LVFO 2006*f*). Fishers have been forced to move further offshore and have felt the need to use more intensive fishing practices, such as gillnets with smaller mesh sizes (LVFO 2005) to continue to catch enough fish to make a living. The Nile perch, which used to be considered food for poor people in communities around the Lake because of its less preferred taste (e.g., 85% of fishermen prefer tilapia—LVFO 2006*b*), has become too expensive for the average area resident (Shoko et al. 2005). Government officials attribute the declining fish stocks in part to the continued use of banned fishing gear and practices (Magubira 2008, Mulisa 2008).

According to the Lake Victoria Fisheries Organization (2006*c*), controlling fishing on Lake Victoria is hampered by an “open access” policy, which allows for easy entry to the fishery (i.e., makes it easy to become a fisher). This unrestricted access and lack of fishing quotas is said to lead to high fish harvesting rates and a large influx of fishers, which threatens the sustainability of the fisheries resource (Odada et al. 2004). There also is a known disregard for fishing regulations and a lack of enforcement of regulations that is said to be the result of corruption, weak regional integration of laws, institutions, and implementation, and absence of an effective monitoring and control system (Odada et al. 2004, RWG-Monitoring Control and Surveillance 2005). As a result of all of the above, there is no effective legal limit on the number of boats on Lake Victoria or the amount of fishing gear a boat can carry (LVFO 2006*c*). More specifically, problems beyond unrestricted access include: unlicensed fishers; the use of illegal mesh sizes, gear, and techniques; landings below permitted sizes; fishing in areas closed for breeding; illegal trans-border trade (which results in a loss of tax revenue); and lack of knowledge and awareness about environmental and conservation management (RWG-Monitoring Control and Surveillance 2005). The prevalence of fishing nets below size limits, for example, ranges between 3 and 50%, depending on the area (Odada et al. 2005). In spite of limitations in the enforcement of regulations, in only 6 months of 2005 1,612 beach seines, 777 small seines, 17,656 undersized gillnets, 1,360 monofilament gill nets, 564 fishing crafts and 93 tons of immature fish were impounded and 1,760 suspects apprehended on the Lake (LVFO 2006*a*). Management is further complicated by the large number of fishers and large area open to fishing (RWG-Monitoring Control and Surveillance 2005). According to some, there also is a notable lack of involvement of stakeholders in decision-making processes, and a low level of education and awareness about the consequences of unregulated fishing and use of destructive fishing practices (Odada et al. 2004).

APPENDIX B

CHILD SURVEY INSTRUMENT

The children's survey instruments used in public schools in communities surrounding Rubondo Island National Park, Tanzania, during 2008 and 2009 (in Swahili) and English translations. Areas where translation issues were discovered after surveys were administered are highlighted, although results from those questions have not been reported here. Revisons to the initial survey instrument include the following: 1) questions involving general opinions about animals and conservation were reworded because of concern that agree/disagree statements were not culturally/age appropriate; 2) a question that asked for the participant's "favorite animal" was divided into 3 parts to differentiate between favorite domestic and wild animals; 3) specific questions were added about 2 of the species students had most commonly listed as favorites to allow for direct comparison of participants' affinity levels for those iconic species and others; 4) the survey format was simplified; 5) I differentiated between wild fish and farmed or already-caught fish (i.e., fish that belong to people) in questions regarding the diet of each animal to gain an understanding of why some piscivores are more well-liked than others; and 6) a drawing of a pineapple scaled to the appropriate size was added next to each animal drawing to provide students a culturally-relevant size reference. Larger copies of each illustration also were made available to students during the second round of surveying to increase the ease of identification. In both cases, the surveys used were printed slightly larger than they appear here.

B(1). Original survey (version 1) in Swahili.

Asante kwakuwa mmojawapo wa mafunzo haya. Tunafurahi kwamba tutajifunza mengi kuhusu wewe na maoni yako. Sehemu ya kwanza ya dodoso hili inahusu wewe. Sehemu ya pili inahusu maoni yako. Kama kuna sehemu ndani ya dodoso hili ambazo huwezi kujaza, usijali, ziache wazi. Na kama hautaweza kujaza sehemu zote, pia usijali.

Asante sana

KUHUSU WEWE

1. Je, kijiji chako kinaitwaje? ______________________

2. Kati ya maneno yafuatayo, ni neon gain linaloonyesha kazi afanyayo baba yako?

☐ Mkulima ☐ Mfanyabiashara ☐ Mfugaji

☐ Mvuvi ☐ Maganga wa jadi ☐ Mengineyo ______________
(Tafadhali andika kazi hapa)

3. Jina la kabila ya familia yako linaitwaje? ______________________

4. Je mababu na mabibi zako ama ngugu zako walishawahi kusishi ndani ya kisiwa cha Rubondo?

☐ Ndiyo ☐ Hapana ☐ Sina hakika

KUHUSU MAONI YAKO

1. Ni aina gani ya wanyama ambao unawapenda zaidi (kwa mfano mtu anaweza kupendelea zaidi mnyama mwenye rangi za udongo)

2. Tafadhali weak lama ya x kwenye vibox vilivyopo chini ya majibu, yanayoelezea jinsi unavyoona kuhusu sentensi zilizo kwenye jedwali hapo chini.

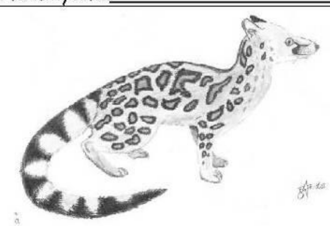
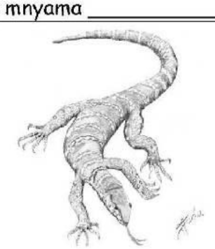
	Nakataa	Sikubaliani na yoyote	Nakubali	Sina uhakika/Sina maoni
Wanyamapori ni muhimu kwangu hata kama hawatumiki kama kitoweo au kwa mambo mengine.	☐	☐	☐	☐
Ninafikiri ni muhimu kwamba wanyama wawe na mahali pa kuishi.	☐	☐	☐	☐
Kati ya vitu vinavyonifanya nijivunie ni kwamba, nyumbani kwangu ni karibu na Hifhadi ya Kisiwa cha Rubondo.	☐	☐	☐	☐

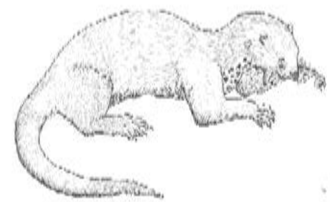
3. Je umeshawahi kutembelea Hifadhi ya Kisiwa cha Rubondo?

☐ Ndiyo ☐ Hapana ☐ Sina Uhakika

4. Kama hujawahi, je ungependa kuitembelea? ☐ Ndiyo ☐ Hapana ☐ Labda

5. Katika jedwali lifuatalo, tafadhali weka alama ya x katika jibu lililo sahihi katika kila swali kuhusu wanyama walio katika picha. Pia, tafadhali andika jina la kila mnyama kwenye mistari iliyo chini ya picha.

	Je mnyama huyu huish karibu na kiji chako au hutembelea kiji chako?	Je mnyama huyu anakula nini? (Weka alama kwenye chakula anachokula)	Je unafikiri mnyama huyu anavutia?	Je unafikiri mnyama huyu anmanufaa?	Je unampenda mnyama huyu?	Je ungependa wanyama hao wawe wengi sehemu unayoishi?
 Jina la mnyama________________________	☐ Ndiyo ☐ Hapana ☐ Sina uhakika	☐ Mimea ya porini ☐ Mimea inayopandwa na watu ☐ Wanyamapori ☐ Mifugo ☐ Samaki ☐ Mengineyo ☐ Sina uhakika	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ ndiyo ☐ Hapna ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni
 Jina la mnyama ________________________	☐ Ndiyo ☐ Hapana ☐ Sina uhakika	☐ Mimea ya porini ☐ Mimea inayopandwa na watu ☐ Wanyamapori ☐ Mifugo ☐ Samaki ☐ Mengineyo ☐ Sina uhakika	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni
 Jina la mnyama________________________	☐ Ndiyo ☐ Hapana ☐ Sina uhakika	☐ Mimea ya porini ☐ Mimea inayopandwa na watu ☐ Wanyamapori ☐ Mifugo ☐ Samaki ☐ Mengineyo ☐ Sina uhakika	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni

	Je mnyama huyu huish karibu na kiji chako au hutembelea kiji chako?	Je mnyama huyu anakula nini? (Weka alama kwenye chakula anachokula)	Je unafikiri mnyama huyu anavutia?	Je unafikiri mnyama huyu anmanufaa?	Je unampenda mnyama huyu?	Je ungependa wanyama hao wawe wengi sehemu unayoishi?
 Jina la mnyama________________	☐ Ndiyo ☐ Hapana ☐ Sina uhakika	☐ Mimea ya porini ☐ Mimea inayopandwa na watu ☐ Wanyamapori ☐ Mifugo ☐ Samaki ☐ Mengineyo ☐ Sina uhakika	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni
 Jina la mnyama________________	☐ Ndiyo ☐ Hapana ☐ Sina uhakika	☐ Mimea ya porini ☐ Mimea inayopandwa na watu ☐ Wanyamapori ☐ Mifugo ☐ Samaki ☐ Mengineyo ☐ Sina uhakika	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni
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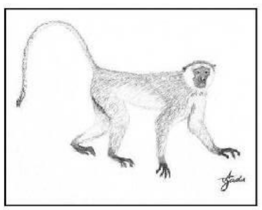
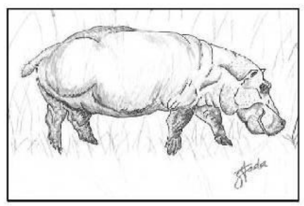
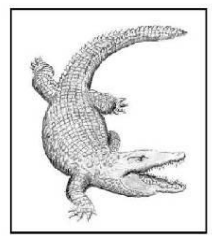
(Picha kilichorwa na Arthur Oyuda)

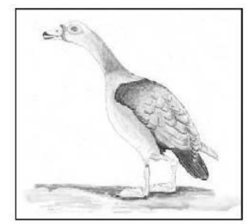
1. Tafadhali tazama picha za wanyama wafuatao. Tafadhali zungushia duara kwenye wanyama ambao umeshawahi kuwaona kijijini kwako (kama hivi ).
Tafadhali weka alama ya x kwenye wanyama ambao hujawahi kuwaona kijijini kwako (kama hivi ).

2. Kama unafahanu majina ya wanyama waliopo kwenye picha hapa chini, tafadhali andika majina hayo kwenye mistari iliyopo juu ya majedwali hayo.

3. Tafadhali chora mstari kotoka kwenye kila mchoro wa wanyama hapo chini, kuelekea kwenye neno (au maneno) kwa ajili ya kila chakula wanachokula wanyama hao.
Usisahau kwamba mnyama anaweza kula zaidi ya aina mmoja ya chakula.

A ____________________ B ____________________ C ____________________ D ____________________ E ____________________



Samaki | Wanyamapori | Mifugo | Mimea ya porini | Mimea inayopandwa na watu

4. Tafadhali angalia herufi zilizopo juu ya kila mchoro wa mnyama. Halafu andika herufi inayoendana na kila mnyama kwenye boksi ambalo linaelezea jinsi unavyofikiria juu ya mnyama huyo.

Wanyama ambao nawapenda	**Wanyama ambao siwapendi**

B(2). Original survey (version 1) backtranslated to English.

Thank you for being a part of this study. We are excited to learn more about you and your opinions. The first section of this survey is about you. The second part is about your opinions. If there are any questions on this survey that you do not want to answer it is okay to leave them blank. If you do not finish the survey, that is okay too.

Thank you!

ABOUT YOU

1. What is the name of your village? ______________________

2. Which word below best describes your father's work?

☐ Farmer ☐ Businessman ☐ Livestock keeper

☐ Fisherman ☐ Traditional healer ☐ Other ________________
(Please write profession here)

3. What is the name of your tribe? __________________________

4. Did any of your ancestors or family members ever live on Rubondo Island?

☐ Yes ☐ No ☐ Not sure

ABOUT YOUR OPINIONS

1. What kinds of animals do you like the best? (For example, someone might like brown animals the best.)

2. Please put an X in the box below the answer that best tells how you feel about the sentences below.

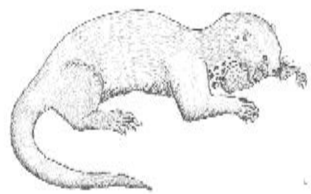
	Disagree	Disagree on all	Agree	Not sure/No opinion
Wild animals are important to me even if they cannot be used for food or other purposes.	☐	☐	☐	☐
I think it is important that wild animals have a place to live.	☐	☐	☐	☐
Among the things that makes me proud is that my home is near Rubondo Island National Park.	☐	☐	☐	☐

3. Have you visited Rubondo Island National Park? ☐ Yes ☐ No ☐ Not sure

4. If not, would you like to visit? ☐ Yes ☐ No ☐ Maybe

5. In the table below, please put an X next to the best answer to each of the questions about the animals in the pictures. Please also write the name of each animal on the line below its picture.

	Does this animal live near your village or visit your village?	What does this animal eat? (Mark the food the animal eats)	Do you think this animal is attractive?	Do you think this animal is useful?	Do you like this animal?	Do you like these animals to be many where you live?
 Name of the Animal________________	☐ Yes ☐ No ☐ Not sure	☐ Wild plants ☐ Plants that people grow ☐ Wild animals ☐ Livestock ☐ Fish ☐ Other ☐ Not sure	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion
 Name of the Animal________________	☐ Yes ☐ No ☐ Not sure	☐ Wild plants ☐ Plants that people grow ☐ Wild animals ☐ Livestock ☐ Fish ☐ Other ☐ Not sure	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion
 Name of the Animal________________	☐ Yes ☐ No ☐ Not sure	☐ Wild plants ☐ Plants that people grow ☐ Wild animals ☐ Livestock ☐ Fish ☐ Other ☐ Not sure	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion

	Does this animal live near your village or visit your village?	What does this animal eat? (Mark the food the animal eats)	Do you think this animal is attractive?	Do you think this animal is useful?	Do you like this animal?	Do you like these animals to be many where you live?
 Name of the Animal________	☐ Yes ☐ No ☐ Not sure	☐ Wild plants ☐ Plants that people grow ☐ Wild animals ☐ Livestock ☐ Fish ☐ Other ☐ Not sure	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion
 Name of the Animal________	☐ Yes ☐ No ☐ Not sure	☐ Wild plants ☐ Plants that people grow ☐ Wild animals ☐ Livestock ☐ Fish ☐ Other ☐ Not sure	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion
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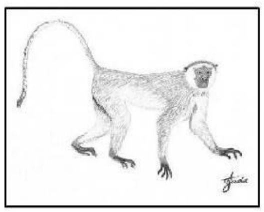
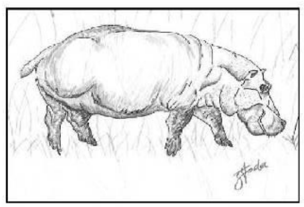
1. Please look at the pictures of the animals below. Please circle the pictures of the animals you have seen near your village (like this: ). Please put an X through the pictures of animals you have not seen near your village (like this: ).

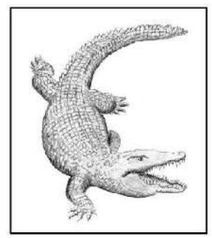
2. If you know the names of the animals in the pictures below, please write them on the lines above the pictures.

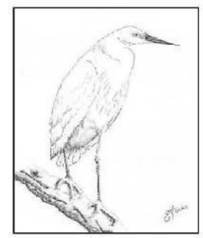
3. Please draw a line from each of the animal drawings below to the word (or words!) for the kind of food the animal eats. Don't forget, an animal can eat more than 1 kind of food!

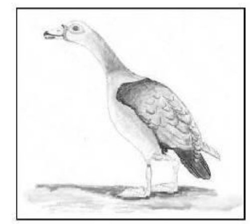
A ____________________ B ____________________ C ____________________ D ____________________ E ____________________











Fish | Wild animals | Livestock | Wild plants | Plants that people grow

4. Please look at the letters above each animal drawing. Then, write the letter that goes with each animal in the box that best tells how you feel about that animal.

Animals that I like	Animals that I do not like

B(3). Revised survey (version 2) in Swahili.

Asante kwakuwa mmojawapo wa mafunzo haya. Tunafurahi kwamba tutajifunza mengi kuhusu wewe na maoni yako. Sehemu ya kwanza ya dodoso hili inahusu wewe. Sehemu ya pili inahusu maoni yako. Kama kuna sehemu ndani ya dodoso hili ambazo huwezi kujaza, usijali, ziache wazi. Na kama hautaweza kujaza sehemu zote, pia usijali. Asante sana!

KUHUSU WEWE

1. Je, kijiji chako kinaitwaje? ________________________

2. Jinsia ☐ Msichana ☐ Mvulana

3. Kati ya maneno yafuatayo, ni neno gain linaloonyesha kazi afanyayo baba yako?
(Kama hauishi na mzazi wako wa kiume tafadhali, chagua neon moja linaloelezea, shughulu anayofanya mkuu wa familia.)

☐ Mkulima ☐ Mfanyabiashara ☐ Mfugaji

☐ Mvuvi ☐ Maganga wa jadi ☐ Mengineyo __________________
(Tafadhali andika kazi hapa)

4. Jina la kabila ya familia yako linaitwaje? ____________________________

5. Je mababu na mabibi zako ama ngugu zako walishawahi kusishi ndani ya kisiwa cha Rubondo?

☐ Ndiyo ☐ Hapana ☐ Sina hakika

KUHUSU MAONI YAKO

1. Ni aina gani ya wanyamapori ambao unawapenda zaidi (kwa mfano mtu anaweza kupendelea zaidi mnyama mwenye rangi za udongo)?

2. Ni aina gani ya wanyama wanaofugwa na binadamu, zaidi ya mbwa, ambao unawawapenda zaidi?

3. Kati ya hao wanyama waliotanjwa kwenye swali la pili, ni wapi ambao unawapenda zaidi?

4. Je unafikiri kwamba wanyama ni uhimu pale tu watakapotumika kwa chakula na mambomegine?

☐ Ndiyo ☐ Hapana ☐ Sina Uhakika

5. Je unafikiri kwamba ni muhimu kwamba wanyamapori wawe na mahali pa kuishi?

☐ Ndiyo ☐ Hapana ☐ Sina Uhakika

6. Je umeshawahi kutembelea Hifadhi ya Kisiwa cha Rubondo?

☐ Ndiyo ☐ Hapana ☐ Sina Uhakika

Kama hujawahi, je ungependa kuitembelea? ☐ Ndiyo ☐ Hapana ☐ Labda

7. Katika jedwali lifuatalo, tafadhali weka alama ya x katika jibu lililo sahihi katika kila swali kuhusu wanyama walio katika picha. Pia, tafadhali andika jina la kila mnyama kwenye mistari iliyo chini ya picha. Mchoro wananasi mewekwa karibu na mnyama ili kukuonyesha, ukubwa wa mnyama huyo.

	Je mnyama huyu huish karibu na kiji chako au hutembelea kiji chako?	Je mnyama huyu anakula nini? (Weka alama kwenye chakula anachokula. Myama anaweza kula zadi ya aina moja ya chakula.)	Je unafikiri mnyama huyu anavutia?	Je unafikiri mnyama huyu anmanufaa?	Je unampenda mnyama huyu?	Je ungependa wanyama hao wawe wengi sehemu unayoishi?
 Jina la mnyama__________	☐ Ndiyo ☐ Hapana ☐ Sina uhakika	☐ Mimea ya porini ☐ Mimea inayopandwa na watu ☐ Wanyamapori ☐ Mifugo ☐ Samaki wasiofugwa na watu ☐ Samaki ambao wamekamatwa na wanafugwa na binada ☐ Mengineyo ☐ Sina uhakika	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni
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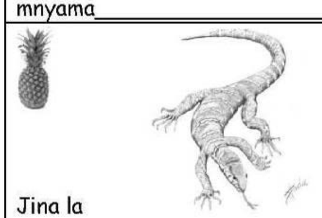
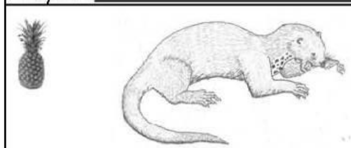
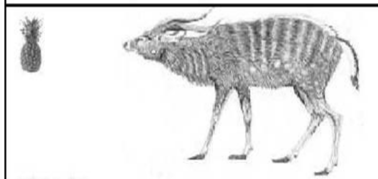
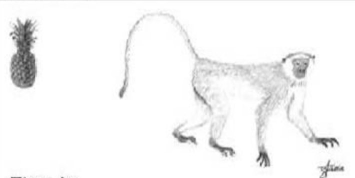
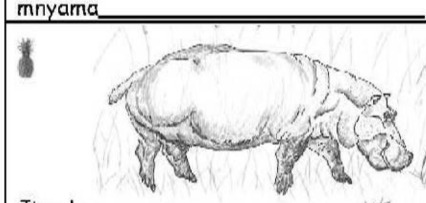
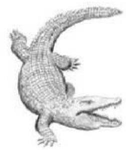
 Jina la mnyama__________	☐ Ndiyo ☐ Hapana ☐ Sina uhakika	☐ Mimea ya porini ☐ Mimea inayopandwa na watu ☐ Wanyamapori ☐ Mifugo ☐ Samaki wasiofugwa na watu ☐ Samaki ambao wamekamatwa na wanafugwa na binada ☐ Mengineyo ☐ Sina uhakika	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni
 Jina la mnyama__________	☐ Ndiyo ☐ Hapana ☐ Sina uhakika	☐ Mimea ya porini ☐ Mimea inayopandwa na watu ☐ Wanyamapori ☐ Mifugo ☐ Samaki wasiofugwa na watu ☐ Samaki ambao wamekamatwa na wanafugwa na binadamu ☐ Mengineyo ☐ Sina uhakika	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni

	Je mnyama huyu huish karibu na kiji chako au hutembelea kiji chako?	Je mnyama huyu anakula nini? (Weka alama kwenye chakula anachokula. Myama anaweza kula zadi ya aina moja ya chakula.)	Je unafikiri mnyama huyu anavutia?	Je unafikiri mnyama huyu anmanufaa?	Je unampenda mnyama huyu?	Je ungependa wanyama hao wawe wengi sehemu unayoishi?
 Jina la mnyama__________	☐ Ndiyo ☐ Hapana ☐ Sina uhakika	☐ Mimea ya porini ☐ Mimea inayopandwa na watu ☐ Wanyamapori ☐ Mifugo ☐ Samaki wasiofugwa na watu ☐ Samaki ambao wamekamatwa na wanafugwa na binada ☐ Mengineyo ☐ Sina uhakika	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni
 Jina la mnyama__________	☐ Ndiyo ☐ Hapana ☐ Sina uhakika	☐ Mimea ya porini ☐ Mimea inayopandwa na watu ☐ Wanyamapori ☐ Mifugo ☐ Samaki wasiofugwa na watu ☐ Samaki ambao wamekamatwa na wanafugwa na binada ☐ Mengineyo ☐ Sina uhakika	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni
 Jina la mnyama__________	☐ Ndiyo ☐ Hapana ☐ Sina uhakika	☐ Mimea ya porini ☐ Mimea inayopandwa na watu ☐ Wanyamapori ☐ Mifugo ☐ Samaki wasiofugwa na watu ☐ Samaki ambao wamekamatwa na wanafugwa na binada ☐ Mengineyo ☐ Sina uhakika	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni
 Jina la mnyama__________	☐ Ndiyo ☐ Hapana ☐ Sina uhakika	☐ Mimea ya porini ☐ Mimea inayopandwa na watu ☐ Wanyamapori ☐ Mifugo ☐ Samaki wasiofugwa na watu ☐ Samaki ambao wamekamatwa na wanafugwa na binada ☐ Mengineyo ☐ Sina uhakika	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni

	Je mnyama huyu huish karibu na kiji chako au hutembelea kiji chako?	Je mnyama huyu anakula nini? (Weka alama kwenye chakula anachokula. Myama anaweza kula zadi ya aina moja ya chakula.)	Je unafikiri mnyama huyu anavutia?	Je unafikiri mnyama huyu anmanufaa?	Je unampenda mnyama huyu?	Je ungependa wanyama hao wawe wengi sehemu unayoishi?
 Jina la mnyama________	☐ Ndiyo ☐ Hapana ☐ Sina uhakika	☐ Mimea ya porini ☐ Mimea inayopandwa na watu ☐ Wanyamapori ☐ Mifugo ☐ Samaki wasiofugwa na watu ☐ Samaki ambao wamekamatwa na wanafugwa na binada ☐ Mengineyo ☐ Sina uhakika	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni
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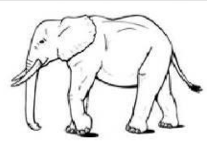 Jina la mnyama________	☐ Ndiyo ☐ Hapana ☐ Sina uhakika	☐ Mimea ya porini ☐ Mimea inayopandwa na watu ☐ Wanyamapori ☐ Mifugo ☐ Samaki wasiofugwa na watu ☐ Samaki ambao wamekamatwa na wanafugwa na binada ☐ Mengineyo ☐ Sina uhakika	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni	☐ Ndiyo ☐ Hapana ☐ Sina uhakika ☐ Sina maoni
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B(4). Revised survey (version 2) backtranslated to English.

Thank you for being a part of this study. We are excited to learn more about you and your opinions. The first section of this survey is about you. The second part is about your opinions. If there are any questions on this survey that you do not want to answer it is okay to leave them blank. If you do not finish the survey, that is okay too. Thank you!

ABOUT YOU

1. What is the name of your village? ______________________

2. Gender ☐ Girl ☐ Boy

3. Which word below best describes your father's work?
(If you do not live with your father, please choose the word that explains the work of the head of your household.)

☐ Farmer ☐ Businessman ☐ Livestock keeper
☐ Fisherman ☐ Traditional healer ☐ Other ________________
(Please write profession here)

4. What is the name of your tribe? __________________________

5. Did any of your ancestors or family members ever live on Rubondo Island?

☐ Yes ☐ No ☐ Not sure

ABOUT YOUR OPINIONS

1. What kinds of wild animals do you like the best? (For example, someone might like brown animals the best.)

2. What type of animals kept by humans, other than dogs, do you like the most?

3. Among the animals you mentioned $\boxed{\text{in the second question,}}$ which do you like the most?

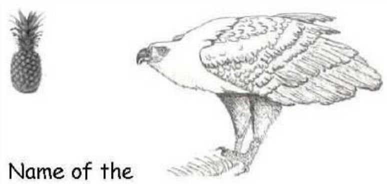
4. Do you think animals are important only if they are used for food or other purposes?
☐ Yes ☐ No ☐ Not sure

5. Do you think it is important for wild animals to have a place to live?
☐ Yes ☐ No ☐ Not sure

6. Have you ever visited Rubondo Island National Park?
☐ Yes ☐ No ☐ Not sure

If not, would you like to visit? ☐ Yes ☐ No ☐ Maybe

7. In the table below, please put an X next to the best answer to each of the questions about the animals in the pictures. Please also write the name of each animal on the line below its picture. The pineapple drawing has been placed near the animal to show the size of that animal.

	Does this animal live near your village or visit your village?	What does this animal eat? (Mark the food the animal eats. The animal could eat more than 1 type of food.)	Do you think this animal is attractive?	Do you think this animal is useful?	Do you like this animal?	Do you like these animals to be many where you live?
 Name of the animal__________________	☐ Yes ☐ No ☐ Not sure	☐ Wild plants ☐ Plants that people grow ☐ Wild animals ☐ Livestock ☐ Non-domesticated fishes ☐ Fish caught and stocked by people ☐ Other ☐ Not sure	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion
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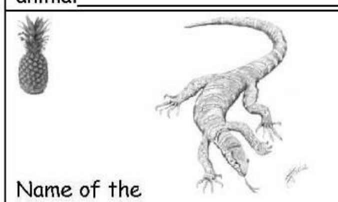
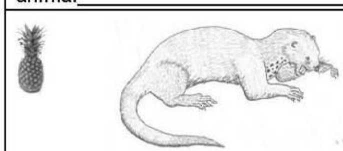
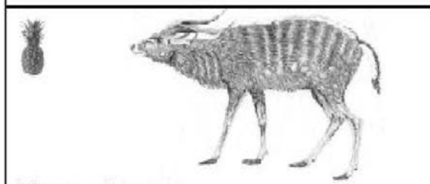
 Name of the animal__________________	☐ Yes ☐ No ☐ Not sure	☐ Wild plants ☐ Plants that people grow ☐ Wild animals ☐ Livestock ☐ Non-domesticated fishes ☐ Fish caught and stocked by people ☐ Other ☐ Not sure	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion
 Name of the animal__________________	☐ Yes ☐ No ☐ Not sure	☐ Wild plants ☐ Plants that people grow ☐ Wild animals ☐ Livestock ☐ Non-domesticated fishes ☐ Fish caught and stocked by people ☐ Other ☐ Not sure	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion

	Does this animal live near your village or visit your village?	What does this animal eat? (Mark the food the animal eats. The animal could eat more than 1 type of food.)	Do you think this animal is attractive?	Do you think this animal is useful?	Do you like this animal?	Do you like these animals to be many where you live?
 Name of the animal_______________	☐ Yes ☐ No ☐ Not sure	☐ Wild plants ☐ Plants that people grow ☐ Wild animals ☐ Livestock ☐ Non-domesticated fishes ☐ Fish caught and stocked by people ☐ Other ☐ Not sure	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion
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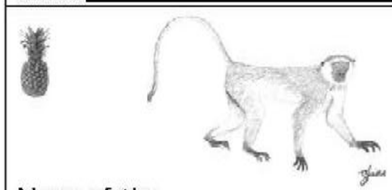
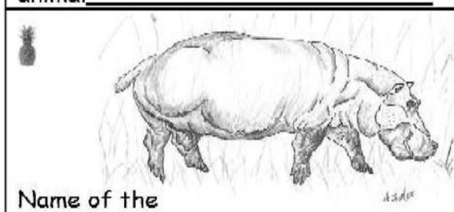
 Name of the animal_______________	☐ Yes ☐ No ☐ Not sure	☐ Wild plants ☐ Plants that people grow ☐ Wild animals ☐ Livestock ☐ Non-domesticated fishes ☐ Fish caught and stocked by people ☐ Other ☐ Not sure	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion
 Name of the animal_______________	☐ Yes ☐ No ☐ Not sure	☐ Wild plants ☐ Plants that people grow ☐ Wild animals ☐ Livestock ☐ Non-domesticated fishes ☐ Fish caught and stocked by people ☐ Other ☐ Not sure	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion

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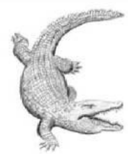 Name of the animal________________	☐ Yes ☐ No ☐ Not sure	☐ Wild plants ☐ Plants that people grow ☐ Wild animals ☐ Livestock ☐ Non-domesticated fishes ☐ Fish caught and stocked by people ☐ Other ☐ Not sure	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion
 Name of the animal________________	☐ Yes ☐ No ☐ Not sure	☐ Wild plants ☐ Plants that people grow ☐ Wild animals ☐ Livestock ☐ Non-domesticated fishes ☐ Fish caught and stocked by people ☐ Other ☐ Not sure	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion
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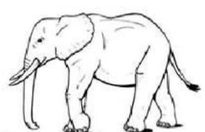 Name of the animal________________	☐ Yes ☐ No ☐ Not sure	☐ Wild plants ☐ Plants that people grow ☐ Wild animals ☐ Livestock ☐ Non-domesticated fishes ☐ Fish caught and stocked by people ☐ Other ☐ Not sure	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion	☐ Yes ☐ No ☐ Not sure ☐ No opinion
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APPENDIX C

THE CONFUSION OF COLLOQUIAL NAMES: A WILDLIFE-SPECIFIC METHODOLOGICAL CHALLENGE IN CROSS-CULTURAL RESEARCH

Abstract

Researchers working in cultures different than their own face many documented methodological challenges, and often undocumented ones as well. One challenge specific to wildlife-related research is that created by the variation in local and colloquial names ascribed to various species. Such variation in local names transcends countries and continents, and can result in a single species being known by multiple names in the same area or by different names in communities with little separation, or can result in many species being known by 1 name. As part of a research project intended to assess local perceptions of wildlife species present in Tanzania's Rubondo Island National Park, I administered a survey to 932 school children in public primary schools in 7 surrounding communities during 2008 and 2009. In the survey, participants were asked to name the species represented by animal illustrations, with my intent being to classify the labels provided based on whether they were indicative of respondents' familiarity with the species in question. Participants provided up to 37 different names for each species ($\bar{x}$ = 19.8, sd = 13.3). Determining whether many of the names indicated familiarity with the species among respondents proved challenging. I discuss these challenges, the methods used for navigating them, and approaches other researchers could apply to avoid them in the future.

Introduction

Researchers working in cultures different from their own face many documented methodological challenges including, for example, differences in language, difficulties of translation, and issues of trust (Triandis and Brislin 1984, Harkness 2003, Browne-Nũnez and Jonker 2008, Hennink 2008, Irvine et al. 2008, Liamputtong 2008*a*). Cross-cultural research issues specific to individual disciplines (e.g., wildlife/conservation—Manfredo and Dayer 2004, Zinn and Shen 2007, Browne-Nũnez and Jonker 2008, Drury et al. 2011) and techniques (e.g., surveys—Harkness et al. 2003, Liamputtong 2008*b*) also have been discussed in the literature. In the case of survey research, differences have been documented across cultures in: the level of influence exerted by survey format (e.g., the type of response scale used—Schwarz 2003) and social desirability bias (Johnson and Van de Vijver 2003), appropriate types and measurement of demographic variables (Braun and Mohler 2003), non-response rates (Couper and de Leeuw 2003), the sensitivity of topics (Skjåk and Harkness 2003), and the appropriateness of survey methods (e.g., mail vs. telephone) (Skjåk and Harkness 2003).

Such literature provided guidance for many of the challenges related to the cross-cultural nature of my research on the preferences and opinions regarding wildlife among people living around Rubondo Island National Park, Tanzania. One challenge that has received little attention, however—perhaps because it is often limited to those working in human dimensions of wildlife conservation and management—is that created by the variation in colloquial and local names ascribed to individual species. Although the problem of dueling names for a species has been minimized within the scientific community through the development and use of various ordering and naming systems (e.g., Cantino et al. 1999, Mayer and Boch 2002), ambiguity persists among common vernaculars. For example, in the United States, the American goldfinch (*Carduelis tristis*) is also commonly known as the wild canary, yellow-bird, thistle-bird, and beet-bird (Gill 1995). Likewise, the fisher (*Martes pennanti*) has also been called the fisher cat, black cat, Pennant’s marten, pekan, pequam, and wejack, among others (Powell 1993, Powell et al. 2003). Surprisingly though, given the widespread use of local or colloquial names for wildlife, I was unable to find mention in the research literature of the confusion that can be created when species are known by many different names. The issues that this variation in names can create, however, are doubtlessly faced by many researchers studying the human dimensions of wildlife conservation and management—not only those considering themselves to be working “crossculturally." Here, I discuss the largely-unexpected challenges associated with the diversity of colloquial and local names for wildlife that I faced in a survey of students in public primary schools in Tanzania, the methods I used for navigating those challenges, and approaches other researchers could apply to avoid them.

Scope of the Investigation—A Brief Overview

As part of a research project intended to assess local perceptions of wildlife species present in Tanzania's Rubondo Island National Park (Figure C.1a), I administered a survey to 932 public primary school students in 7 surrounding communities (Figure C.1b) during 2008 and 2009. The original version of the survey that I distributed to 791 of the 932 participants contained a series of questions about 11 of the wildlife species present in Rubondo (fish eagle [*Haliaeetus vocifer*], Egyptian goose [*Alopochen aegyptiacus]*, silver cyprinid [*Rastrineobola argentea*], little egret [*Egretta garzetta*], sitatunga [*Tragelaphus speki*], large-spotted genet [*Genetta tigrina*], monitor lizard [*Varanus niloticus*], spotted-necked otter [*Lutra maculicollis*], vervet monkey [*Cercopithecus pygerythrus*], Nile crocodile [*Crocodylus niloticus*], and hippopotamus [*Hippopotamus amphibious*]. A revised version of the survey that I administered to 141 of the 932 participants also included questions about 2 additional species present in the Park: the African elephant [*Loxodanta africana*] and giraffe [*Giraffa camelopardalis*])(Appendices B[1-4]). I was interested in assessing participants' familiarity with each of the included species, as well as participants' knowledge, opinions, and preferences regarding each. The following species-specific questions were included in the survey:

- Does this animal live near your village or visit your village?
- What does this animal eat?
- Is this animal attractive?
- Is this animal useful?

- Do you like this animal?
- Would you like many of this animal where you live?

To assess familiarity with the included species, I placed a line drawing of each animal prior to a set of the above questions, along with a request that students label that image (i.e., provide a name for the animal). In addition to serving as an assessment of participants' familiarity with each species, the request for students to label the illustration (instead of providing one myself) enabled me to exclude the responses of students unfamiliar with each species from analyses of participants' knowledge and opinions about the animal. Consequently, I assessed each participant's familiarity with each species prior to analyzing responses to knowledge and opinion questions.

Diversity of Names

Participants provided between 1 and 37 names for each animal ($\bar{x}$ = 19.8, sd = 13.3) (Table C.1); ≥30 different names were provided for 5 of the species included. The elephant was the only species students did not provide more than 1 name for.

Classifying Names – Approaches and Challenges

To classify the variety of names provided by students for each species, I used my own limited knowledge of the Swahili language; suggestions and information provided by informants (i.e., Tanzanian Swahili speakers, including Rubondo Island National Park staff and project team members); Swahili dictionaries (Awde 2000, Snoxall and Mshindo 2002, kamusiproject.org, and africanlanguages.com/swahili); and lists of Swahili animal names created by safari companies. The specific Swahili and tribal names for each intended species were classified as "acceptable" (i.e., considered to demonstrate familiarity with the species). In addition, names commonly used locally to refer to the intended species were accepted, even if the names in "proper" usage refer to a different species. In addition, more general names used to refer to the "type" of animal were accepted in specific cases when the term was commonly used for the intended species locally and other locally-present species comprised a guild similar in appearance and interactions with humans, such that participants likely perceived them similarly (see below for examples). A name was classified as "unacceptable" if used to refer specifically to a different species or if it was too generic to demonstrate familiarity among respondents' with the specific species intended (e.g., "bird"). Responses that could not be confidently classified as "acceptable" or "unacceptable" were placed into a 3rd category: "unclassifiable." This category was included because I was concerned about appropriately making classification for some tribal names, and also because the students' spelling and handwriting were sometimes uninterpretable.

The challenges of classifying the various names provided by students were varied and often unique. The following are some specific examples of decision-making regarding classifications:

1. The general name *tai* [eagle] was considered "acceptable" for fish eagle because no specific name is commonly used for the species and other species of eagles are less common in the area. However, I did not accept *ndege* [bird] for any of the bird species because the label was considered too broad. A student writing *ndege* could be answering later questions about any 1 of many species with very different food habits and interactions with people. In addition, the label "bird" does not demonstrate any familiarity with the intended species.
2. For the silver cyprinid, specifically called *dagaa*, *samaki* [fish] was accepted as an answer, although seemingly directly in contrast with the justification cited above for the rejection of *ndege*. Given the size of the fish illustrated (depicted in relation to a person's hand―see Table C.1) and the ubiquity of the silver cyprinid as a food, I expect most students writing "*samaki*" were answering later questions with *dagaa* in mind, regardless of the generic nature of their response. However, if a student answered, for example,

"*samaki sangara*" [Nile perch, *Lates niloticus*], I classified the response as "unacceptable" because the student would be answering questions with a distinctly different fish in mind. Nile perch occupy a niche in the aquatic food web dissimilar to that of silver cyprinids, and the 2 species also are drastically different in size and how they are used by people (e.g., expensive export versus common local food, respectively). More difficult to classify was "*furu*" (haplochromine fishes) because both haplochromines and the silver cyprinid are smaller, native species. However, because the 2 species occupy different habitats within Lake Victoria and are caught using different methods, and because haplochromines were not as ubiquitous a food item, *furu* was classified as "unacceptable."

3. *Swala* [antelope] was accepted for sitatunga. This response was considered "acceptable" because the species is a type of antelope rare enough that students may not be familiar with the specific name. However, when a student specifically listed the name of a different species of antelope (e.g., *nyumbu* [wildebeest, *Connochaetes* spp.]), this was not considered "acceptable" because the student was no longer likely to be answering questions generically about "antelope." Conversely, *paa*, although occasionally translated as antelope (e.g., Awde 2000), was not accepted because the name is widely used in the study area to refer to the bushbuck (*Tragelaphus scriptus*), which, although similar in appearance, is a much more common species. Because of this difference in rarity, "*paa*" was not accepted for sitatunga.
4. For the vervet monkey, *nyani* was accepted even though this name generally translates to "baboon" or "ape" because *nyani* is commonly used to refer to the vervet monkey in the study area.
5. For the little egret, *ndege mweupe* [white bird] was classified as "unacceptable" because the term was considered by some informants to be specific to the cattle egret (*Bulbulcus ibis*). However, the most commonly used word for the cattle egret (*nyangenyange*) is

used to refer to both that species and the little egret, and therefore my results are not specific to the little egret regardless of the exclusion of responses specific to "*ndege mweupe*."

6. *Maji* [water] and *ndege wa maji* [water bird] were both put in "unclassifiable" columns when offered by students for the name of the otter [*fisi maji*] and Egyptian goose, respectively. The most common "acceptable" name for the otter contains the word "water" [*maji*] and the species is most often found there, so the student using the term may have been trying to communicate some knowledge of the species. The student who wrote *ndege wa maji* for the Egyptian goose may have been thinking of the correct species but simply did not know the name. Conversely, that student may have been thinking of another water bird, and for the otter, the single student who wrote "*maji*" may have been thinking of some other species associated with the water (e.g., marsh mongoose, *Atilax paludinosus*).
7. *Kicheche* was considered "acceptable" because it is the most commonly used name for genet in the area. However, *kicheche* is not strictly translated to "genet" nor does it refer only to the genet (the name also is used locally to refer to other species of similar size, such as the marsh mongoose).

Assessing classifications. Whenever the classification of a name given by a substantial number of students was questionable, I conducted further assessments prior to any analysis dependent on that classification. For example, 138 of the 932 students who were asked to label the illustration of the Egyptian goose wrote "*bata mzinga*," which formally translates to "turkey." However, 2 of my informants believed that the students may have meant for this name to refer to the Egyptian goose because there is no commonly known Swahili name specific to the species. Because my informants were not all in agreement about a name that such a substantial number of students provided, I was especially concerned about the effect the classification would have on my results.

In particular, I was concerned that by eliminating students who provided the name "*bata mzinga*," I was eliminating a particular type of participant (e.g., those from 1 island community).

To better understand the effects of challenging classifications, such as that mentioned above, and to increase my comfort level with all classifications, I conducted further analytical assessments. For example, I used binary logistic regression models (Vaske 2008) to assess the influence of measured demographic variables on students' ability to "acceptably" name each species (see Chapter 3). If students from certain communities or backgrounds (e.g., with parents in the same professions) were less likely to provide what I classified as an "acceptable" name for a species, I then assessed whether those students provided any specific name I had classified as "unacceptable." If students from, for example, the same community appeared to provide a particular "unacceptable" name for a species often, I conducted Pearson's chi-square analysis (Vaske 2008) to test whether they were doing so more frequently than students from other communities. Additionally, in the case of particularly challenging classifications (such as that of *bata mzinga*) I repeated analyses of variables for which the sample to be included depended on my determination of students' familiarity with the species using all opposing classification schemes. As an example, one type of analysis I conducted on the data collected was to model, using binary logistic regression, the effect of demographic variables on "dislike" and "desire for few individuals of a species nearby" among students familiar with the species (see Chapter 3). In that case, I developed sets of models for "disliking" and "wanting few" of the species using 2 different subsamples of the data collected, each based on 1 of the 2 opposing classification schemes (e.g., including "*bata mzinga*" among the "acceptable" responses vs. among the "unacceptable" ones). After building the 2 sets of candidate models and choosing the best of each using the Akaike's Information Criterion (Burnham and Anderson 1998), I re-assessed each opposing classification scheme based on how demographics included in the models changed. The additional analyses gave me insight into how much influence the different classifications of particular names had on results. Generally, the results of such analyses supported my inclinations to be conservative with classification by discarding responses I was not absolutely confident referred to the species intended. However, these steps were far from ideal and also quite time consuming.

The above examples demonstrate some of challenges associated with classification of students' labels for animal illustrations, as well as some of the decisions regarding classification that were unique to each species. In addition, decisions were largely influenced by my specific research questions. Were those questions to change many of my classifications would need to be revisited. For example, if interested mainly in students' levels of competency in wildlife identification, I would likely have categorized names provided for the silver cyprinid quite differently. The provision of the label "fish," which I classified among the "acceptable" responses given knowledge of local circumstances, does not indicate a high level of competency in wildlife identification. However, although classified as labeling the image "unacceptably," the students providing names specific to fish species indistinguishable from the intended based on the image provided likely have a fairly high level of knowledge about fish.

Decisions about classification were complicated by my limited familiarity with the languages spoken locally and the need to complete my data analyses away from the study site, which limited contact with the people who were the focus of my research. Because of the limited contact, I could not easily follow up when questions arose during analysis. Those in my study communities whose contact information I did have (e.g., teachers at the schools where surveys conducted) were not necessarily those with the most knowledge of wildlife. In addition, few Park staff, who I relied on heavily as informants, were from the local area and even those that were local likely did not know all names used for each species by tribes and villages other than their own. Finally, as noted in the case of the acceptability of "*bata mzinga*" for the Egyptian goose, informants did not always agree on whether a name should be considered "acceptable."

Avoiding Ambiguity

A fairly low percentage of participants were able to name many species included in my survey (see Chapter 2), perhaps in part because most children in the area likely had seen few illustrations of less famous African wildlife (e.g., spotted-necked otter and sitatunga, which only 18% and 21% of participants, respectively, were able to provide "acceptable" labels for—Chapter 2) or because of the limitations of the black and white illustrations used (e.g., the lack of colors that could help in identification). Including several color illustrations and/or photographs of each species, perhaps from different vantages, may have increased students' ability to name the animals. The revised version of my survey, which I administered to a subsample of participants, did include an illustration of a locally common fruit (a pineapple) in each frame as a size reference, which seemed to increase students' ability to "correctly" name the illustrations.

One approach that could be used to avoid the ambiguity of colloquial or local names while maintaining the integrity of the survey's assessment of children's familiarity with and opinions about wildlife may be to provide participants a list of names to choose among for the labeling section of the survey. To develop such a list, the researcher ideally would work with a sample of members of the study community to document all the "acceptable" names for each species to be included in the survey. A secondary step within that process (analogous to "back translation"—Harkness 2003) that could help ensure the accuracy of the information used would be to ask a separate sample of community members to match the names provided by the first sample with images. This step would also provide an opportunity to test various images for use in the final survey. Such a process would ideally result in a list of vetted, mutually exclusive names matching the species intended for inclusion in the survey (i.e., a list that included several unambiguous names for each species). Such a process would also be preferable to traditional multiple choice options provided for each species (which I had avoided due to the increased potential for participants to randomly choose the correct answer) because the proportion of responses correct by chance would be minimized. In addition, being able to include several "acceptable" options for each species in a larger list would improve the likelihood of participants familiar with the species finding the name by which they know the species.

Conclusions

Variation in names used for an individual species among locations is not specific to Tanzania. Neither is the extremely "local" nature of such names. For example, around Pennsylvania, USA's Pymatuning Swamp, the eastern massasauga (*Sistrurus catenatus catenatus*) used to be known almost invariably as the "black snapper," and only occasionally the "swamp rattler" and "pygmy rattler." However, in more western areas, although sometimes called the "black snapper," the species was also commonly called the "black massasauga," "black rattler," and "prairie rattlesnake" (Gresh 1931). Also not restricted to Tanzania is the use of the same name for >1 species. In fact, in the USA, the sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*Accipiter cooperi*), and northern goshawk (*Accipiter gentilis*) have all been commonly called "chicken hawk." In addition, all 3 go by some variation on "blue darter" (i.e., "big blue darter," "little blue darter," or, simply, "blue darter"), and the sharp-shinned and Cooper's hawks also are called "pigeon hawk" (Pearson 1917). Clearly, the problem of multiple local names for a species transcends continents and countries. The problem is likely also not faced only by researchers working in far different cultures, but also those working within their own communities with people from different backgrounds.

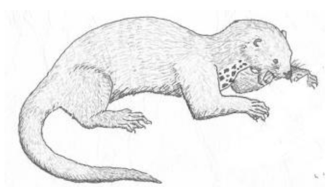
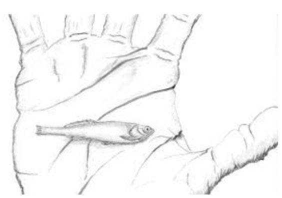
Researchers need to be prepared for the challenges associated with colloquial and local names when studying the human dimensions of wildlife conservation or management in a cross-cultural context, and develop strategies for addressing potential ambiguity prior to beginning work. Such preparation is particularly important when researchers want to assess participants' familiarity with the species in question but will not have personal contact with each participant and so must build some "test" of familiarity into the survey instrument. Some of the suggestions I developed as a result of the challenges I faced in classifying the local and colloquial wildlife names provided by children participating in my survey in communities surrounding Rubondo Island National Park are to:

- Include multiple illustrations or pictures of each species to be named (with at least 1 in color).
- Include a size reference within each frame to assist participants in identifying the species.
- Work with members of the study community *a priori* to create a list of mutually exclusive names specific to each of the species of interest, and ask survey participants to use that list for animal labeling activities, instead of allowing open-ended responses.

These suggestions are intended as a starting point for researchers assessing familiarity or preferences regarding wildlife in a cross-cultural context, but as each situation is unique, appropriate approaches will vary widely.

Table C.1. List of names considered “acceptable,” “unacceptable,” and “unclassifiable” for each species included in my 2008/2009 survey regarding the wildlife preferences and opinions of children in communities surrounding Rubondo Island National Park, Tanzania. Although common, most spelling variations for identifiable answers are not noted here. In addition, the list of “acceptable” names only includes those offered by participants and is not an exhaustive review of the names used for the given species.

Ilustration Included in Survey	English & Scientific Names for Intended Species	Names Considered “Acceptable” ***(i.e., names expected to result in respondents answering later questions about the species intended)***	Names Considered “Unacceptable” ***(i.e., names expected to result in respondents answering later questions about a species not intended)***	Names Considered “Unclassifiable” ***(i.e., names that could not be identified/translated)***
	**Fish eagle (*Haliaeetus vocifer*)**	kwazo (kwezi), tai, tai samaki	bundi, bwana afya, kasuku, kenge, kicheche, kuku, kunguru, kanga, kunguni, kwale, mabundi, mbuni, mbweha, mwewe, njiwa, paa, tausi	bukwali, bwa, kahumi, kunmulu, kuyugu, mburu, taiga, tani, tayinga, teger
	**Large-spotted genet (*Genetta tigrina*)**	cheche, kicheche, nyalukala, paka pori	bundi, bweha, chiriku, chita, chui, duma, fina, fisi, fisi maji, kaa, kaka kuona, kangaruu, kima, kuchakulo, kwale, mbweha, mbwa mwitu, mondo, paka, paka kuona, paka mifupa, paka shume, panya, panya buku, tausi	chun, fengi, hui

	**Monitor lizard (*Varanus niloticus*)**	kenge, mbulu kenge, mjusi	dinosaria, fina, kiboko, kicheche, kijusi, kimbulu, mamba, mtoto wa mamba, mwewe, tembo	
	**Spotted-necked otter (*Lutra maculicollis*)**	fisi maji, fina	cheche, chui, fisi, fisi mtu, kenge, kima, kimbulu, kinyonga, kiwi, kobe, kima, mamba, mbwa, ngedere, nyarukala, nyumbu, paka, paka pori, panya, panya buku, panya pori, papa, sokwe mtu, nungunungu, nyani, nyumbu, nyamgumi, kinyonga	chutu, kui, maji, pnam
	**Sitatunga (*Tragelaphus speki*)**	nyesanga, nzobe, nzohe, swala	choroa, chui, digidigi, farasi, fisi, kifaru, mbogo, mbuni, mbuzi, ngamia, ng'ombe, ng'ombe mwitu, nungunungu, nyati, nyumbu, paa, pongo, puma, punda, punda milia, simba, sokwe, sokwe mtu, swoko, tandala, twiga	fwata, mbulu, nyahufahu, swa, tui tui
	**Silver cyprinid (*Rastrineobola argentea*)**	dagaa, samaki, soga	fulu, mamba, samaki sangara, swala	ningu, smio

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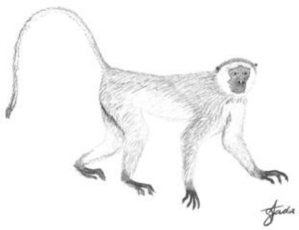
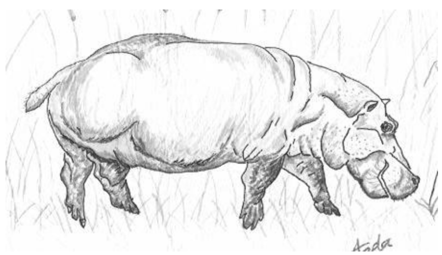
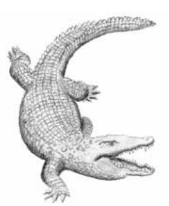
	**Vervet monkey (*Cercopithecus pygerythrus*)**	kima, ngedere, nyani, tumbili	mbega, ngami, nyati, simba	chani, maidi, nclepe, nyoui, sbakam, tubbau
	**Hippopotamus (*Hippopotamus amphibius*)**	kiboko, enzubha	kifaru, kobe, faru, kondoo, mbogo, nguruwe, nyati, samaki, tembo	kamwbo, koma, ng
	**Nile crocodile (*Crocodylus niloticus*)**	mamba	kenge, kimboko, simba	nyawgeny
	**Little egret (*Egretta garzetta*)**	nyangenyange, yangeyange	bata maji, bwana afya, chiriku, kasuku, korongo, kunguru, mbuni, mumbi, mwewe, ndege, ndege mweupe, njiwa, tai, tausi	balwa, balwe, bwanata, bwanaaa, gogi, mamukolo, mrobi, nlse, nyenye, nzela nzela, nyamukola, zerazera, ndege maji

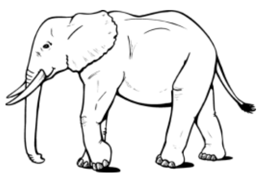
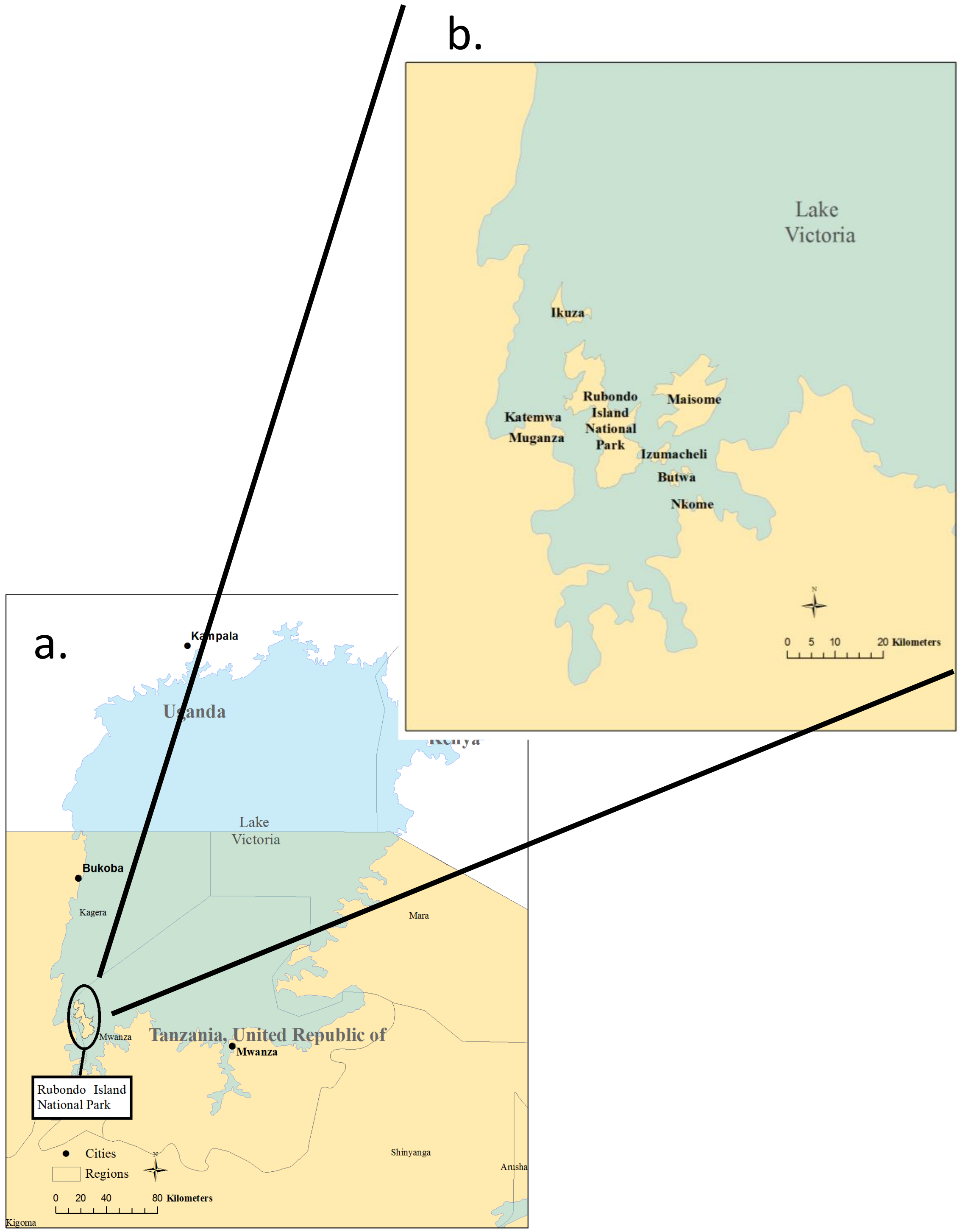
	**Egyptian goose (*Alopochen aegyptiacus)***	lyoyo, bata maji, bata pori	bata, bata mzinga, bwana afya, flamingo, kanga, kasuku, kenge, kuku, kunguru, mbuni, mwewe, ndege, njiwa pori, paa, puku puku, tai, tausi, yangeyange	balwe, bata mzima, bata nyange, chimbara, kilimanzoka, mboata, mime, nsazu, nsozu, nudendi, nyawawa, nyawewe, sonzu, sozu, sozo, ndege wa maji
	**African elephant (*Loxodonta africana*)**	tembo		
	**Giraffe (*Giraffa camelopardalis*)**	twiga	punda milia, swala	nlunga

Figure C.1. The location of Rubondo Island National Park in Lake Victoria, Tanzania (a), as well as the surrounding communities where I conducted surveys regarding the wildlife preferences of primary school children (b).



APPENDIX D

TOP AFFINITY AND ABUNDANCE MODELS BY SPECIES

The top models for explaining “dislike” for and wanting “few” of each species included in surveys of public primary school students in communities surrounding Rubondo Island National Park, Tanzania, in 2008 and 2009.

D(1). Top models for explaining "dislike" for each species of wildlife included in a 2008/2009 survey of schoolchildren in communities surrounding Rubondo Island National Park, Tanzania. The first set for each species is developed from 2009 data only, and includes "gender" as a variable. The second set includes 2008 data as well, but not the "gender" variable (which was not collected during 2008). The second set also contains additional dummy variables for "school," as sampling was conducted in more villages in 2008. All models for each species within 2 units of the lowest AIC/AIC$_c$ score are shown here, unless the null model is within 2 units, in which case no models with scores above that of the null model are shown regardless of whether they are within 2 units of the model with the lowest AIC/ AIC$_c$ value. No results are shown here for a species when the null model has the lowest AIC/AIC$_c$ value. (Notes: Head of household is abbreviated H.O.H. The pseudo R^2 measure used is McFadden's R^2. LR Chi^2 is an abbreviation for Likelihood Ratio Chi^2 test. AIC is Akaike's Information Criterion, and AIC$_c$ is the small sample bias adjustment for that value. w_i is the Akaike weight for the model.)

D1.1. Top models for "dislike" of fish eagles (2009).

	Mod21	Mod16	Mod23
	Odds Ratio	Odds Ratio	Odds Ratio
Do not like spp.			
Att. Katemwa Sch.	8.26**	4.42**	4.61**
	[1.56,43.59]	[1.15,16.96]	[1.21,17.65]
Att. Muganza Sch.	0	0	0
	[0.00,.]	[0.00,0.00]	[0.00,.]
H.O.H. fisherman	5.60*		
	[0.95,33.15]		
H.O.H. livestock keeper		0	
		[0.00,.]	
Constant	0.08***	0.17***	0.17***
	[0.02,0.35]	[0.06,0.50]	[0.06,0.48]
LR Chi^2	18.29***	14.54***	14.23***
Pseudo R^2	0.27	0.21	0.21
AIC	58.40	60.14	60.46
AIC_C	59.04	60.79	60.84
Δ AIC_C	0	1.75	1.80
w_i	0.40	0.17	0.16
n	67	67	67

Confidence intervals in parentheses

*p < 0.10 **p < 0.05 ***p < 0.01

D1.2. Top models for “dislike” of fish eagles (2008 & 2009).

	Mod3bBESTRef Odds Ratio	Mod7bBESTRef Odds Ratio
Do not like spp.		
Att. Ikuza Sch.	0	0
	[0.00,.]	[0.00,.]
Att. Muganza Sch.	0	0
	[0.00,.]	[0.00,.]
Att. Butwa Sch.	0.37**	0.36**
	[0.15,0.89]	[0.15,0.87]
Att. Maisome Sch.	0.13*	0.13*
	[0.02,1.04]	[0.02,1.02]
Att. Izumacheli Sch.	0.23***	0.23***
	[0.10,0.57]	[0.10,0.57]
Att. Nkome Sch.	0.40**	0.40**
	[0.20,0.81]	[0.20,0.81]
Std. 6	2.51***	2.52***
	[1.34,4.73]	[1.34,4.74]
Std. 4 & 5	1.28	1.333
	[0.13,12.26]	[0.14,12.91]
H.O.H. fisherman		1.17
		[0.52,2.61]
Constant	0.26***	0.26***
	[0.14,0.51]	[0.13,0.51]
LR Chi^2	37.61***	37.75***
Pseudo R^2	0.11	0.11
AIC	324.40	326.26
AIC_C	324.87	326.83
Δ AIC_C	0	1.97
w_i	0.51	0.19
n	397	397

Confidence intervals in parentheses
*p < 0.10 **p < 0.05 ***p < 0.01

D1.3. Top models for “dislike” of genets (2009).

	Mod31 Odds Ratio	Null Odds Ratio
Do not like spp.		
Att. Katemwa Sch.	1.01	
	[0.33,3.08]	
Att. Muganza Sch.	0	
	[0.00,.]	
Constant	1.62	1.42
	[0.81,3.23]	[0.84,2.39]
LR Chi^2	5.53*	0.00
Pseudo R^2	0.07	0.00
AIC	79.14	80.67
AIC_C	79.59	80.74
w_i	0.35	0.20
n	58	58

Confidence intervals in parentheses
*p < 0.10 **p < 0.05 ***p < 0.01

D1.4.Top models for “dislike” of genets (2008 & 2009).

	Mod11 Odds Ratio	Mod10 Odds Ratio	Mod5 Odds Ratio
Do not like spp.			
Att. Katemwa Sch.	2.45	1.68	2.33
	[0.62,9.69]	[0.39,7.22]	[0.58,9.32]
Att. Muganza Sch.	0	0	0
	[0.00,.]	[0.00,.]	[0.00,.]
Att. Butwa Sch.	1.67	1.37	1.61
	[0.42,6.56]	[0.33,5.70]	[0.41,6.35]
Att. Nkome Sch.	1.00	0.89	0.98
	[0.27,3.79]	[0.23,3.40]	[0.26,3.69]
Att. Izumacheli Sch.	2.82	2.22	2.81
	[0.65,12.15]	[0.50,9.91]	[0.65,12.11]
o.Att. Maisome Sch.	1	1	1
	[1.00,1.00]	[1.00,1.00]	[1.00,1.00]
H.O.H. livestock keeper	6.39*	5.78	6.12*
	[0.77,53.06]	[0.69,48.50]	[0.73,51.05]
Std. 6		1.62	
		[0.89,2.94]	
Std. 4 & 5		1.39	
		[0.40,4.78]	
H.O.H. farmer			0.85
			[0.51,1.43]
Constant	0.67	0.60	0.76
	[0.19,2.36]	[0.17,2.16]	[0.20,2.86]
LR Chi^2	21.04***	23.58***	21.406***
Pseudo R^2	0.06	0.06	0.06
AIC	365.69	367.15	367.32
AIC_C	366.25	367.10	368.02
Δ AIC_C	0	1.75	1.77
w_i	0.428369	0.18	0.18
n	269	269	269

Confidence intervals in parentheses
*p < 0.10 **p < 0.05 ***p < 0.01

D1.5. Top models for "dislike" of monitor lizards (2009).

	Mod23 Odds Ratio	Mod16 Odds Ratio
Do not like spp.		
Att. Katemwa Sch.	1.62	1.66
	[0.76,3.44]	[0.78,3.53]
Att. Muganza Sch.	0.70	0.68
	[0.31,1.61]	[0.29,1.56]
H.O.H. livestock keeper		1.66
		[0.53,5.18]
Constant	0.95	0.91
	[0.51,1.78]	[0.48,1.73]
LR Chi^2	6.19**	6.95*
Pseudo R^2	0.02	0.03
AIC	260.09	261.33
AIC_C	260.23	261.55
Δ AIC_C	0	1.32
w_i	0.39	0.20
n	188	188

Confidence intervals in parentheses

*p < 0.10 **p < 0.05 ***p < 0.01

D1.6. Top models for "dislike" of monitor lizards (2008 & 2009).

	Mod14b	Mod8b	Mod12b	Mod6b
	Odds Ratio	Odds Ratio	Odds Ratio	Odds Ratio
Do not like spp.				
Std. 6	2.18***	2.17***	2.17***	2.16***
	[1.60,2.97]	[1.59,2.96]	[1.59,2.96]	[1.58,2.94]
Std. 4 & 5	2.32	2.41*	2.36*	2.45*
	[0.84,6.40]	[0.87,6.68]	[0.85,6.51]	[0.88,6.79]
H.O.H. fisherman		0.73		0.73
		[0.46,1.17]		[0.46,1.17]
H.O.H. livestock keeper			1.32	1.31
			[0.72,2.40]	[0.72,2.39]
Constant	0.56***	0.58***	0.55***	0.57***
	[0.44,0.70]	[0.45,0.74]	[0.43,0.69]	[0.44,0.73]
LR Chi^2	25.43***	27.14***	26.24***	27.93***
Pseudo R^2	0.03	0.03	0.03	0.03
AIC	950.73	951.02	951.92	952.23
Δ AIC	0	0.29	1.19	1.50
w_i	0.32	0.28	0.18	0.15
n	702	702	702	702

Confidence intervals in parentheses
*p < 0.10 **p < 0.05 ***p < 0.01

D1.7. Top models for "dislike" of spotted-necked otters (2008 & 2009).

	Mod5 Odds Ratio	Mod13LSTK Odds Ratio	Mod9 Odds Ratio
Do not like spp.			
Std. 6	2.73**	2.56**	2.69**
	[1.25,5.97]	[1.17,5.59]	[1.24,5.84]
Std. 4 & 5	4.67*	5.64**	5.33**
	[0.90,24.13]	[1.09,29.04]	[1.04,27.39]
H.O.H. fisherman	0.39*		
	[0.14,1.13]		
H.O.H. livestock keeper		2.27	
		[0.76,6.83]	
Constant	0.29***	0.24***	0.25***
	[0.15,0.56]	[0.12,0.46]	[0.13,0.48]
LR Chi^2	11.83***	10.58**	8.44**
Pseudo R^2	0.06	0.05	0.04
AIC	199.94	201.19	201.33
AIC_C	200.20	201.45	201.48
Δ AIC_C	0	1.25	1.29
w_i	0.37	0.20	0.20
n	159	159	159

Confidence intervals in parentheses
*p < 0.10 **p < 0.05 ***p < 0.01

D1.8. Top models for “dislike” of sitatunga (2009).

	Mod15 Odds Ratio	Mod23 Odds Ratio	Mod25 Odds Ratio	Mod18 Odds Ratio	Mod13 Odds Ratio
Do not like spp.					
Att. Katemwa Sch.	4.15	4.97			4.45
	[0.47,36.61]	[0.58,42.55]			[0.51,38.74]
Att. Muganza Sch.	0.529	0.71			0.56
	[0.03,9.50]	[0.04,12.43]			[0.03,10.13]
Son of a fisher	0.00				
	[0.00,.]				
Gender			0.30*	0.31*	
			[0.09,1.08]	[0.09,1.10]	
H.O.H. livestock keeper				0	
				[0.00,.]	
H.O.H. fisherman					0.36
					[0.04,3.24]
Constant	0.11**	0.08**	0.40**	0.44**	0.11**
	[0.01,0.88]	[0.01,0.64]	[0.19,0.83]	[0.21,0.91]	[0.01,0.84]
LR Chi^2	9.31**	6.59**	3.71*	5.82*	7.60*
Pseudo R^2	0.13	0.09	0.05	0.08	0.11
AIC	69.62	70.35	71.23	71.12	71.33
AIC_C	70.22	70.70	71.40	71.47	71.93
ΔAIC_C	0	0.48	1.18	1.25	1.71
w_i	0.30	0.24	0.17	0.16	0.13
n	72	72	72	72	72

Confidence intervals in parentheses
*p < 0.10 **p < 0.05 ***p < 0.01

D1.9. Top models for “dislike” of sitatunga (2008 & 2009).

	Mod11B Odds Ratio	Mod5B Odds Ratio	NullB Odds Ratio
Do not like spp.			
Std. 6	2.39*	2.29*	
	[0.90,6.32]	[0.88,5.97]	
Std. 4 & 5	0	0	
	[0.00,.]	[0.00,.]	
H.O.H. livestock keeper	3.22		
	[0.73,14.21]		
Constant	0.09***	0.10***	0.18***
	[0.04,0.22]	[0.04,0.24]	[0.12,0.27]
LR Chi^2	6.30*	4.18	0.00
Pseudo R^2	0.04	0.03	0.00
AIC	157.98	158.09	158.27
AIC_C	158.20	158.22	158.30
Δ AIC_C	0	0.022	0.09
w_i	0.21	0.21	0.20
n	182	182	182

Confidence intervals in parentheses

*p < 0.10   **p < 0.05   ***p < 0.01

D1.10. Top models for “dislike” of silver cyprinids (2009).

	Mod12 Odds Ratio	Mod10 Odds Ratio	Mod1 Odds Ratio	Mod11 Odds Ratio
Do not like spp.				
Std. 7	0.00	0.00	0.00	
	[0.00,0.00]	[0.00,0.00]	[0.00,.]	
Std. 4 & 5	0.00	0.00	0.00	
	[0.00,0.00]	[0.00,0.00]	[0.00,0.00]	
H.O.H. fisherman		2.35		
		[0.44,12.61]		
Att. Katemwa Sch.			0.31	0.60
			[0.07,1.42]	[0.14,2.64]
Att. Muganza Sch.			0	0
			[0.00,0.00]	[0.00,0.00]
Male			2.06	
			[0.46,9.14]	
Constant	0.06***	0.05***	0.11***	0.08***
	[0.03,0.12]	[0.02,0.11]	[0.02,0.49]	[0.03,0.27]
LR Chi^2	4.43	5.31**	9.54**	4.98**
Pseudo R^2	0.07	0.08	0.14	0.08
AIC	63.91	65.03	64.80	65.36
AIC$_C$	64.04	65.25	65.26	65.49
Δ AIC$_C$	0	1.21	1.22	1.45
w_i	0.34	0.19	0.19	0.17
n	190	190	190	190

Confidence intervals in parentheses

*p < 0.10 **p < 0.05 ***p < 0.01

D1.11. Top models for “dislike” of silver cyprinids (2008 & 2009).

	Mod9 Odds Ratio	Mod6 Odds Ratio
Do not like spp.		
H.O.H. fisherman	2.97**	3.10***
	[1.27,6.97]	[1.32,7.28]
Std. 6		1.37
		[0.62,3.02]
Std. 4 & 5		0
		[0.00,.]
Constant	0.03***	0.03***
	[0.02,0.05]	[0.01,0.06]
LR Chi^2	5.36**	7.57*
Pseudo R^2	0.02	0.03
AIC	233.27	235.06
Δ AIC	0	1.80
w_i	0.50	0.20
n	694	694

Confidence intervals in parentheses
*p < 0.10 **p < 0.05 ***p < 0.01

D1.12. Top model for “dislike” of vervet monkeys (2009).

	Mod5 Odds Ratio
Do not like spp.	
Male	0.37*
	[0.13,1.06]
H.O.H. farmer	2.35**
	[1.01,5.46]
Son of a farmer	1.40
	[0.36,5.35]
Constant	0.32***
	[0.17,0.60]
LR Chi^2	16.02***
Pseudo R^2	0.07
AIC	235.30
AIC_C	235.50
Δ AIC_C	0
w_i	0.50
n	213

Confidence intervals in parentheses
*p < 0.10 **p < 0.05 ***p < 0.01

D1.13. Top model for "dislike" of vervet monkeys (2008 & 2009).

	Mod6b Odds Ratio
Do not like spp.	
Att. Katemwa Sch.	4.57**
	[1.34,15.59]
Att. Muganza Sch.	2.84
	[0.76,10.68]
Att. Butwa Sch.	4.76**
	[1.33,17.02]
Att. Maisome Sch.	6.58***
	[1.85,23.43]
Att. Izumacheli Sch.	6.01***
	[1.67,21.65]
Att. Nkome Sch.	3.35*
	[0.96,11.62]
H.O.H. farmer	1.55***
	[1.13,2.14]
Constant	0.08***
	[0.02,0.28]
LR Chi^2	27.65***
Pseudo R^2	0.03
AIC	987.49
Δ AIC	0
w_i	0.68
n	803

Confidence intervals in parentheses
*p < 0.10 **p < 0.05 ***p < 0.01

D1.14. Top models for “dislike” of hippopotamuses (2009).

	Mod31 Odds Ratio	Null Odds Ratio
Do not like spp.		
Son of a livestock keeper	0.18	
	[0.02,1.44]	
Constant	0.62***	0.59***
	[0.46,0.84]	[0.43,0.79]
LR Chi^2	3.95**	0.00
Pseudo R^2	0.02	0.00
AIC	246.29	248.25
AIC_C	246.36	248.27
Δ AIC_C	0	1.91
w_i	0.46	0.18
n	187	187

Confidence intervals in parentheses
*p < 0.10 **p < 0.05 ***p < 0.01

D1.15. Top models for "dislike" of hippopotamuses (2008 & 2009).

	Mod19 Odds Ratio	Mod16 Odds Ratio	Mod15 Odds Ratio	Mod14 Odds Ratio
Do not like spp.				
H.O.H. livestock keeper	0.52**	0.50**	0.54*	0.52*
	[0.27,0.99]	[0.26,0.96]	[0.28,1.05]	[0.27,1.01]
Std. 6		1.27		1.23
		[0.93,1.72]		[0.89,1.69]
Std. 4 & 5		0.50		0.47
		[0.13,1.93]		[0.11,1.95]
Att. Katemwa Sch.			0.73	0.65
			[0.33,1.59]	[0.29,1.46]
Att. Muganza Sch.			0.38**	0.36**
			[0.16,0.94]	[0.15,0.90]
Att. Butwa Sch.			0.56	0.59
			[0.24,1.33]	[0.24,1.42]
Att. Nkome Sch.			0.43**	0.41**
			[0.19,0.98]	[0.18,0.93]
Att. Izumacheli Sch.			0.70	0.66
			[0.30,1.64]	[0.28,1.56]
Att. Maisome Sch.			0.62	0.58
			[0.26,1.49]	[0.24,1.40]
Constant	0.85**	0.75**	1.42	1.36
	[0.73,0.99]	[0.59,0.95]	[0.68,2.97]	[0.65,2.86]
LR Chi^2	4.26**	8.21**	15.44**	18.53**
Pseudo R^2	0.00	0.01	0.02	0.02
AIC	954.35	954.40	955.17	956.07
Δ AIC	0	0.05	0.82	1.73
w_i	0.33	0.32	0.22	0.12
n	694	694	694	694

Confidence intervals in parentheses

*p < 0.10 **p < 0.05 ***p < 0.01

D1.16. Top models for "dislike" of crocodiles (2009).

	Mod21
	Odds Ratio
Do not like spp.	
Att. Katemwa Sch.	2.50**
	[1.07,5.80]
Att. Muganza Sch.	3.77***
	[1.46,9.71]
H.O.H. fisherman	3.66**
	[1.10,12.14]
Constant	1.06
	[0.50,2.23]
LR Chi^2	10.35**
Pseudo R^2	0.04
AIC	248.77
AIC_C	248.96
Δ AIC_C	0
w_i	0.33
n	219

Confidence intervals in parentheses
*p < 0.10 **p < 0.05***p < 0.01

D1.17. Top models for “dislike” of crocodiles (2008 & 2009).

	Mod14b	Mod8b	Mod12b
	Odds Ratio	Odds Ratio	Odds Ratio
Do not like spp.			
Std. 6	0.64**	0.64**	0.64**
	[0.44,0.94]	[0.44,0.94]	[0.44,0.94]
Std. 4 & 5	0.27**	0.26**	0.26**
	[0.09,0.77]	[0.09,0.75]	[0.09,0.76]
H.O.H. fisherman		1.27	
		[0.71,2.29]	
H.O.H. livestock keeper			0.84
			[0.42,1.67]
Constant	6.25***	6.08***	6.33***
	[4.61,8.48]	[4.46,8.30]	[4.65,8.61]
LR Chi^2	9.01**	9.67**	9.25**
Pseudo R^2	0.01	0.01	0.01
AIC	766.77	768.11	768.52
Δ AIC	0	1.34	1.75
w_i	0.47	0.24	0.19
n	824	824	824

Confidence intervals in parentheses
*p < 0.10 **p < 0.05 ***p < 0.01

D1.18. Top models for “dislike” of little egrets (2009).

	Mod41 Odds Ratio	Mod14 Odds Ratio	Null Odds Ratio
Do not like spp.			
Son of a livestock keeper	5.61*	6.84*	
	[0.87,35.97]	[0.99,47.18]	
Att. Katemwa Sch.		0.22**	
		[0.06,0.80]	
Att. Muganza Sch.		0.40	
		[0.09,1.73]	
Std. 6		2.32	
		[0.48,11.22]	
Std. 4 & 5		0.00	
		[0.00,.]	
Constant	0.12***	0.19*	0.130***
	[0.07,0.20]	[0.03,1.06]	[0.08,0.21]
LR Chi^2	2.78*	11.05*	0.00
Pseudo R^2	0.02	0.09	0.00
AIC	119.08	118.81	119.86
AIC_C	119.16	119.34	119.88
Δ AIC_C	0	0.18	0.73
w_i	0.27	0.25	0.19
n	165	165	165

Confidence intervals in parentheses
*p < 0.10 **p < 0.05 ***p < 0.01

D1.19. Top models for “dislike” of little egrets (2008 & 2009).

	Mod14B Odds Ratio	Mod8B Odds Ratio	Mod20B Odds Ratio	Mod12B Odds Ratio	Null Odds Ratio
Do not like spp.					
Std. 6	0.81	0.82	0.80		
	[0.50,1.31]	[0.50,1.32]	[0.49,1.30]		
Std. 4 & 5	0.00	0.00	0.00		
	[0.00,.]	[0.00,.]	[0.00,.]		
H.O.H. livestock keeper	1.90			1.94	
	[0.82,4.39]			[0.84,4.47]	
H.O.H. farmer			0.78		
			[0.47,1.27]		
Constant	0.19***	0.20***	0.24***	0.17***	0.17***
	[0.13,0.28]	[0.14,0.29]	[0.15,0.38]	[0.13,0.21]	[0.14,0.22]
LR Chi^2	7.28*	5.23*	6.25*	2.18	0.00
Pseudo R^2	0.02	0.01	0.01	0.00	0.00
AIC	442.60	442.65	443.62	443.70	443.88
Δ AIC	0	0.05	1.03	1.10	1.28
w_i	0.27	0.26	0.16	0.16	0.14
n	527	527	527	527	527

Confidence intervals in parentheses

*p < 0.10 **p < 0.05 ***p < 0.01

D1.20. Top models for “dislike” of Egyptian geese (2009).

	Mod5 Odds Ratio	Mod6 Odds Ratio	Mod9 Odds Ratio	Null Odds Ratio
Do not like spp.				
Son of a fisher	0			
	[0.00,0.00]			
Att. Katemwa Sch.		0.41		
		[0.04,4.26]		
Att. Muganza Sch.		0		
		[0.00,0.00]		
H.O.H. livestock keeper			10.17*	
			[0.71,146.17]	
Constant	0.07***	0.12***	0.05***	0.06***
	[0.03,0.20]	[0.03,0.38]	[0.02,0.16]	[0.02,0.17]
LR Chi^2	1.05	2.88*	2.27	0.00
Pseudo R^2	0.03	0.09	0.07	0.00
AIC	31.25	31.43	32.04	32.30
AIC_C	31.44	31.81	32.23	32.37
Δ AIC	0	0.37	0.79	0.93
w_i	0.29	0.24	0.20	0.18
n	67	67	67	67

Confidence intervals in parentheses

*p < 0.10 **p < 0.05 ***p < 0.01

D1.21. Top models for “dislike” of elephants (2009).

	Mod26 Odds Ratio	Mod15 Odds Ratio	Mod5 Odds Ratio	Mod40 Odds Ratio	Mod37 Odds Ratio	Mod32 Odds Ratio	Mod21 Odds Ratio
Do not like spp.							
Son of a livestock keeper	0.00	0.00					
	[0.00,0.00]	[0.00,0.00]					
Std. 4 & 5	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	[0.00,0.00]	[0.00,.]	[0.00,.]	[0.00,0.00]	[0.00,.]	[0.00,.]	[0.00,.]
Son of a farmer		0.18			0.18		
		[0.02,1.42]			[0.02,1.46]		
Att. Katemwa Sch.			0.66				
			[0.22,2.00]				
Male			0.26**			0.27**	0.26**
			[0.08,0.83]			[0.08,0.85]	[0.08,0.85]
H.O.H. farmer						1.13	
						[0.43,3.01]	
H.O.H. livestock keeper							1.04
							[0.10,10.43]
Constant	0.24***	0.29***	0.50	0.24***	0.29***	0.34***	0.36***
	[0.15,0.39]	[0.18,0.48]	[0.18,1.35]	[0.15,0.38]	[0.17,0.47]	[0.16,0.72]	[0.21,0.64]
LR Chi^2	6.40	10.54***	12.05***	5.55	9.52***	11.59***	11.53***
Pseudo R^2	0.06	0.09	0.11	0.05	0.08	0.10	0.10
AIC	108.40	108.27	108.75	109.26	109.29	109.21	109.27
AIC_C	108.60	108.61	109.09	109.36	109.49	109.55	109.61
ΔAIC_C	0.00	0.00	0.49	0.76	0.89	0.95	1.01
w_i	0.19	0.19	0.15	0.13	0.12	0.12	0.11
n	124	124	124	124	124	124	124

Confidence intervals in parentheses
*p < 0.10 **p < 0.05 ***p < 0.01

D1.22. Top models for "dislike" of giraffes (2009).

	Mod12 Odds Ratio	Mod1 Odds Ratio	Mod37 Odds Ratio	Mod28 Odds Ratio	Mod33 Odds Ratio	Mod7 Odds Ratio	Mod17 Odds Ratio	Mod32 Odds Ratio	Mod5 Odds Ratio	Mod21 Odds Ratio	Mod35 Odds Ratio	Mod26 Odds Ratio
Do not like spp. Std. 4 & 5	0.00 [0.00,0.00]			0.00 [0.00,0.00]	0.00 [0.00,.]		0.00 [0.00,0.00]			0.00 [0.00,0.00]	0.00 [0.00,.]	

Confidence intervals in parentheses

$^*p < 0.10$ $^{**}p < 0.05$ $^{***}p < 0.01$

	Mod12	Mod1	Mod37	Mod28	Mod33	Mod7	Mod17	Mod32	Mod5	Mod21	Mod35	Mod26
Male	0.17 [0.02,1.44]	0.17* [0.02,1.39]	0.18 [0.02,1.52]		0.18 [0.02,1.53]			0.18 [0.02,1.57]				0.17* [0.02,1.40]
H.O.H. livestock keeper	0.00 [0.00,0.00]									0.00 [0.00,0.00]		0.00 [0.00,.]
H.O.H. farmer	4.89 [0.55,43.35]		3.18 [0.60,16.76]		3.44 [0.65,18.28]			3.03 [0.57,16.11]	3.48 [0.67,18.02]		3.77 [0.72,19.61]	
H.O.H. fisherman	3.30 [0.18,59.54]											
Son of a livestock keeper				0.00 [0.00,0.00]			0.00 [0.00,0.00]					
Son of a fisher						0.00 [0.00,0.00]	0.00 [0.00,0.00]					
Son of a farmer							0.53 [0.06,4.61]					
Att. Katemwa Sch.								2.76 [0.32,24.08]		1.92 [0.22,16.51]		
Constant	0.04*** [0.01,0.33]	0.12*** [0.06,0.26]	0.06*** [0.01,0.25]	0.08*** [0.04,0.17]	0.06*** [0.01,0.27]	0.08*** [0.04,0.17]	0.10*** [0.05,0.23]	0.03*** [0.00,0.28]	0.03*** [0.01,0.14]	0.05*** [0.01,0.37]	0.04*** [0.01,0.15]	0.13*** [0.06,0.27]
LR Chi^2	8.93**	3.96**	6.07**	1.98	8.01**	1.65	4.06**	7.10*	2.55	2.71*	4.53	4.51
Pseudo R^2	0.15	0.07	0.10	0.03	0.14	0.03	0.07	0.12	0.04	0.05	0.08	0.08
AIC	57.29	58.26	58.15	58.25	58.21	58.57	58.17	59.12	59.67	59.52	59.69	59.72
AIC_C	58.06	58.37	58.36	58.46	58.57	58.67	58.71	59.48	59.78	59.88	59.90	59.93
Δ AIC	0	0.31	0.30	0.40	0.51	0.61	0.65	1.42	1.72	1.81	1.84	1.87
w_i	0.13	0.11	0.11	0.10	0.10	0.09	0.09	0.06	0.05	0.05	0.05	0.05
n	116	116	116	116	116	116	116	116	116	116	116	116

D(2). Top models for explaining the desire of primary school students in communities surrounding Rubondo Island National Park, Tanzania, to live near “few” animals of each species of wildlife included in my 2008/2009 survey. The first set is developed from 2009 data only and includes “gender” as a variable. The second set includes 2008 data as well, but not the “gender” variable (which was not collected during 2008). The second set also contains additional dummy variables for “school,” as sampling was conducted in more villages in that year. (Notes: Head of household is abbreviated H.O.H. The Pseudo R^2 measure used is McFadden’s R^2, and LR Chi^2 is an abbreviation for Likelihood Ratio Chi^2 test. AIC is Akaike’s Information Criterion, and AIC_c is the small sample bias adjustment for that value. w_i is the Akaike weight for the model.)

D2.1. Top models for wanting “few” fish eagles (2009).

	Mod25 Odds Ratio	Mod14 Odds Ratio	Mod3 Odds Ratio	Mod5 Odds Ratio
Don't want many of spp.				
Male	12.14**	11.34**	18.37**	1.20E+15
	[1.49,98.85]	[1.38,92.85]	[1.58,213.81]	[0.00,.]
H.O.H. livestock keeper		0.00		2.71E+13
		[0.00,.]		[2.71e+13,2.71e+13]
Att. Katemwa Sch.			1.68	1.38
			[0.34,8.34]	[0.19,10.16]
Att. Muganza Sch.			0.10	0.00
			[0.00,2.37]	[0.00,.]
Std. 6			0.05*	0.00
			[0.00,1.14]	[0.00,.]
Std. 4 & 5			0.23	0.00
			[0.01,7.20]	[0.00,.]
H.O.H. fisherman				6.83E+14
				[0.00,.]
Son of a fisher				0.00
				[0.00,.]
Son of a livestock keeper				0.00
				[0.00,0.00]
Constant	0.05***	0.06***	0.44	0.00
	[0.01,0.37]	[0.01,0.42]	[0.02,10.34]	[0.00,.]
LR Chi^2	9.64***	10.81***	17.17***	23.67***
Pseudo R^2	0.12	0.14	0.22	0.31
AIC	71.71	72.54	72.18	69.67
AIC_C	71.90	72.93	73.60	73.67
Δ AIC_C	0	1.03	1.70	1.78
w_i	0.36	0.22	0.15	0.15
n	66	66	66	66

Confidence intervals in parentheses

*p < 0.10 **p < 0.05 ***p < 0.01

D2.2. Top models for wanting "few" fish eagles (2008 & 2009).

	Mod10b Odds Ratio	Mod3b Odds Ratio	Mod4b Odds Ratio
Don't want many of spp.			
Std. 6	2.52***	2.57***	2.50***
	[1.50,4.22]	[1.54,4.30]	[1.49,4.20]
Std. 4 & 5	6.34**	6.96**	5.97**
	[1.21,33.32]	[1.33,36.47]	[1.12,31.73]
H.O.H. livestock keeper	0.39*		0.38*
	[0.13,1.18]		[0.12,1.16]
Att. Katemwa Sch.	3.55*	3.28*	3.61*
	[0.91,13.90]	[0.84,12.81]	[0.92,14.18]
Att. Muganza Sch.	0.60	0.52	0.62
	[0.08,4.38]	[0.07,3.82]	[0.08,4.55]
Att. Butwa Sch.	0.48	0.44	0.52
	[0.11,2.21]	[0.10,2.03]	[0.11,2.42]
Att. Maisome Sch.	0.44	0.41	0.46
	[0.06,3.13]	[0.06,2.90]	[0.07,3.29]
Att. Izumacheli Sch.	1.24	1.09	1.26
	[0.31,5.00]	[0.27,4.37]	[0.31,5.10]
Att. Nkome Sch.	1.27	1.25	1.28
	[0.33,4.87]	[0.33,4.78]	[0.33,4.92]
H.O.H. fisherman			0.80
			[0.38,1.68]
Constant	0.16***	0.16***	0.17***
	[0.04,0.60]	[0.04,0.59]	[0.05,0.61]
LR Chi^2	47.01***	43.68***	47.36***
Pseudo R^2	0.10	0.10	0.10
AIC	427.79	429.13	429.45
AIC_C	428.36	429.59	430.14
$\Delta\ AIC_C$	0	1.23	1.77
w_i	0.43	0.23	0.18
n	394	394	394

Confidence intervals in parentheses

*p < 0.10 **p < 0.05 ***p < 0.01

D2.3. Top models for wanting “few” genets (2009).

	Mod34 Odds Ratio	Null Odds Ratio
Don't want many		
H.O.H. livestock keeper	3.45E+06	
	[0.00,.]	
Constant	2.18***	2.35***
	[1.23,3.86]	[1.33,4.15]
LR Chi^2	2.20	0.00
Pseudo R^2	0.03	0.00
AIC	71.27	71.47
AIC$_C$	71.50	71.54
Δ AIC$_C$	0	0.046
w_i	0.24	0.24
n	57	57

Confidence intervals in parentheses
*p < 0.10   **p < 0.05   ***p < 0.01

D2.4. Top models for wanting "few" genets (2008 & 2009).

	Mod5 Odds Ratio	Mod2 Odds Ratio
Don't want many of spp.		
Att. Katemwa Sch.	2.45	2.47
	[0.56,10.76]	[0.56,10.80]
Att. Muganza Sch.	0.00	0.00
	[0.00,.]	[0.00,.]
Att. Butwa Sch.	1.08	1.01
	[0.26,4.55]	[0.23,4.34]
Att. Nkome Sch.	0.64	0.63
	[0.16,2.54]	[0.16,2.51]
Att. Izumacheli Sch.	2.03	2.01
	[0.44,9.43]	[0.43,9.31]
o.Att. Maisome Sch.	1.00	1.00
	[1.00,1.00]	[1.00,1.00]
H.O.H. livestock keeper	3.76E+12	4.78E+12
	[0.00,.]	[0.00,.]
H.O.H. farmer	0.54**	0.58*
	[0.31,0.93]	[0.32,1.06]
H.O.H. fisherman		1.26
		[0.52,3.07]
Constant	2.03	1.92
	[0.50,8.20]	[0.47,7.86]
LR Chi^2	34.29***	34.56***
Pseudo R^2	0.10	0.10
AIC	340.67	342.40
AIC_C	341.36	343.25
Δ AIC	0	1.89
w_i	0.55	0.21
n	269	269

Confidence intervals in parentheses
*p < 0.10 **p < 0.05 ***p < 0.01

D2.5. Top models for wanting “few” monitor lizards (2009).

	Mod16 Odds Ratio	Mod21 Odds Ratio	Mod23 Odds Ratio	Mod9 Odds Ratio
Don't want many of spp.				
Att. Katemwa Sch.	1.49	1.19	1.44	1.25
	[0.68,3.26]	[0.52,2.71]	[0.66,3.12]	[0.54,2.88]
Att. Muganza Sch.	0.42**	0.38**	0.45*	0.36**
	[0.18,0.97]	[0.16,0.91]	[0.20,1.03]	[0.15,0.87]
H.O.H. livestock keeper	2.58			2.34
	[0.73,9.09]			[0.66,8.36]
H.O.H. fisherman		0.51		0.55
		[0.21,1.25]		[0.22,1.36]
Constant	1.57	2.13**	1.67	1.97*
	[0.82,3.00]	[1.03,4.43]	[0.88,3.16]	[0.94,4.13]
LR Chi^2	13.66***	13.48***	11.30***	15.34***
Pseudo R^2	0.05	0.05	0.04	0.06
AIC	250.25	250.43	250.62	250.57
AIC_C	250.46	250.64	250.74	250.90
Δ AIC_C	0	0.18	0.28	0.43
w_i	0.25	0.23	0.22	0.20
n	191	191	191	191

Confidence intervals in parentheses
*p < 0.10   **p < 0.05   ***p < 0.01

D2.6. Top models for wanting "few" monitor lizards (2008 & 2009).

	Mod10b Odds Ratio	Mod3b Odds Ratio	Mod4b Odds Ratio	Mod7b Odds Ratio
Don't want many of spp.				
Std. 7	0.55***	0.55***	0.55***	0.55***
	[0.40,0.76]	[0.39,0.76]	[0.40,0.77]	[0.40,0.76]
Std. 4 & 5	4.16**	3.83**	4.04**	3.73**
	[1.21,14.36]	[1.12,13.16]	[1.17,13.98]	[1.08,12.83]
H.O.H. livestock keeper	1.66		1.64	
	[0.88,3.13]		[0.87,3.09]	
Att. Katemwa Sch.	1.30	1.32	1.26	1.29
	[0.58,2.88]	[0.59,2.94]	[0.57,2.81]	[0.58,2.87]
Att. Muganza Sch.	0.45*	0.48	0.44*	0.47
	[0.18,1.11]	[0.19,1.19]	[0.18,1.10]	[0.19,1.17]
Att. Butwa Sch.	0.35**	0.37**	0.37**	0.40**
	[0.14,0.84]	[0.16,0.90]	[0.15,0.90]	[0.16,0.96]
Att. Maisome Sch.	0.46*	0.46*	0.45*	0.45*
	[0.19,1.10]	[0.19,1.12]	[0.19,1.09]	[0.19,1.10]
Att. Izumacheli Sch.	0.49	0.52	0.48*	0.51
	[0.21,1.16]	[0.22,1.22]	[0.21,1.14]	[0.22,1.20]
Att. Nkome Sch.	0.48*	0.48*	0.47*	0.47*
	[0.21,1.06]	[0.22,1.07]	[0.21,1.04]	[0.21,1.05]
H.O.H. fisherman			0.76	0.74
			[0.46,1.23]	[0.46,1.21]
Constant	2.08*	2.09*	2.17*	2.19**
	[0.96,4.50]	[0.97,4.53]	[1.00,4.73]	[1.01,4.77]
LR Chi^2	69.46***	66.93***	70.73***	68.35***
Pseudo R^2	0.07	0.07	0.07	0.07
AIC	938.92	939.45	939.65	940.03
AIC_C	0	0.52	0.73	1.11
Δ AIC_C	0.33	0.25	0.23	0.19
w_i	0.30	0.23	0.21	0.17
n	714	714	714	714

Confidence intervals in parentheses

*p < 0.10 **p < 0.05 ***p < 0.01

D2.7. Top models for wanting “few” spotted-necked otters (2008 & 2009).

	Mod3 Odds Ratio	Mod7 Odds Ratio	Mod6 Odds Ratio	Mod8 Odds Ratio
Don't want many of spp.				
Att. Katemwa Sch.	4.08**	3.32*	2.80*	3.11**
	[1.19,14.04]	[0.93,11.81]	[0.97,8.03]	[1.10,8.78]
Att. Muganza Sch.	1.00	1.00	1.00	1.00
	[1.00,1.00]	[1.00,1.00]	[1.00,1.00]	[1.00,1.00]
Att. Ikuza Sch.	0.72	0.62	0.33	0.33
	[0.06,8.22]	[0.05,7.34]	[0.03,3.31]	[0.03,3.33]
Att. Izumacheli Sch.	2.29	1.77	1.33	1.56
	[0.71,7.40]	[0.52,6.02]	[0.49,3.58]	[0.60,4.10]
Att. Maisome Sch.	0.40	0.32	0.19*	0.22*
	[0.06,2.49]	[0.05,2.04]	[0.03,1.07]	[0.04,1.21]
Att. Nkome Sch.	1.30	0.93	0.65	0.83
	[0.22,7.60]	[0.15,5.72]	[0.13,3.35]	[0.17,4.18]
Std. 6	2.30**	2.32**		
	[1.07,4.95]	[1.08,5.02]		
Std. 4 & 5	5.67*	4.80		
	[0.83,38.57]	[0.58,28.89]		
H.O.H. fisherman		0.47	0.44*	
		[0.17,1.29]	[0.17,1.15]	
Constant	0.24**	0.33*	0.77	0.60
	[0.07,0.78]	[0.09,1.16]	[0.32,1.86]	[0.26,1.37]
LR Chi^2	25.58***	27.81***	22.29***	19.36***
Pseudo R^2	0.12	0.13	0.10	0.09
AIC	212.21	211.99	213.51	214.44
AIC$_C$	213.40	213.46	214.46	215.17
Δ AIC$_C$	0	0.05	1.05	1.77
w_i	0.30	0.29	0.18	0.12
n	161	161	161	161

Confidence intervals in parentheses
*p < 0.10 **p < 0.05 ***p < 0.01

D2.8. Top models for wanting "few" sitatunga (2009).

	Mod26 Odds Ratio	Mod18 Odds Ratio	Null Odds Ratio
Don't want many of spp.			
H.O.H. livestock keeper	0.00	0.00	
	[0.00,.]	[0.00,0.00]	
Male		0.84	
		[0.26,2.68]	
Constant	0.31***	0.33***	0.28***
	[0.17,0.55]	[0.15,0.74]	[0.16,0.49]
LR Chi^2	2.56	2.64	1.42E-14
Pseudo R^2	0.03	0.04	2.22E-16
AIC	73.70	73.61	74.25
AIC_C	73.88	73.98	74.31
Δ AIC_C	0	0.10	0.34
w_i	0.26	0.25	0.22
n	69	69	69

Confidence intervals in parentheses
*p < 0.10 **p < 0.05 ***p < 0.01

D2.9. Top models for wanting "few" sitatunga (2008 & 2009).

	Mod5B Odds Ratio	Mod14B Odds Ratio
Don't want many of		
Std. 6	2.48**	2.43**
	[1.05,5.81]	[1.03,5.72]
Std. 4 & 5	0.00	0.00
	[0.00,.]	[0.00,.]
H.O.H. fisherman		1.33
		[0.44,4.08]
Constant	0.14***	0.14***
	[0.07,0.30]	[0.07,0.30]
LR Chi^2	6.68**	6.93*
Pseudo R^2	0.04	0.04
AIC	181.74	183.49
AIC_C	181.87	183.72
Δ AIC_C	0	1.85
w_i	0.42	0.17
n	179	179

Confidence intervals in parentheses
*p < 0.10 **p < 0.05 ***p < 0.01

D2.10. Top models for wanting “few” silver cyprinids (2009).

	Mod13 Odds Ratio	Mod15 Odds Ratio	Mod14 Odds Ratio	Null Odds Ratio
Don't want many of spp.				
Male	2.57*			
	[0.87,7.60]			
H.O.H. farmer		0.41		
		[0.14,1.20]		
H.O.H. livestock keeper			0.00	
			[0.00,.]	
Constant	0.06***	0.14***	0.10***	0.10***
	[0.02,0.14]	[0.08,0.25]	[0.06,0.17]	[0.06,0.16]
LR Chi^2	3.17*	2.86*	2.49	0.00
Pseudo R^2	0.03	0.02	0.02	0.00
AIC	115.89	116.20	116.57	117.06
AIC_C	115.95	116.26	116.64	117.08
ΔAIC_C	0.00	0.31	0.68	1.13
w_i	0.28	0.24	0.20	0.16
n	193	193	193	193

Confidence intervals in parentheses

*p < 0.10 **p< 0.05 ***p< 0.01

D2.11. Top models for wanting "few" silver cyprinids (2008 & 2009).

	Mod13 Odds Ratio
Don't want many of spp.	
Att. Katemwa Sch.	1.44
	[0.47,4.39]
Att. Muganza Sch.	1.29
	[0.28,6.08]
Att. Nkome Sch.	1.41
	[0.43,4.58]
Att. Ikuza Sch.	0.62
	[0.07,5.76]
Att. Izumacheli Sch.	0.25
	[0.03,2.33]
Att. Maisome Sch.	0.00
	[0.00,0.00]
H.O.H. livestock keeper	0.00
	[0.00,.]
Constant	0.06***
	[0.02,0.16]
LR Chi^2	18.34***
Pseudo R^2	0.06
AIC	290.88
w_i	0.56
n	699

Confidence intervals in parentheses
*p < 0.10 **p < 0.05 ***p < 0.01

D2.12. Top models for wanting "few" vervet monkeys (2009).

	Mod2 Odds Ratio
Don't want many of	
Att. Katemwa Sch.	2.66*
	[0.99,7.13]
Male	0.35**
	[0.15,0.85]
H.O.H. livestock keeper	5.72
	[0.67,48.48]
H.O.H. farmer	11.06***
	[3.65,33.54]
H.O.H. fisherman	10.41***
	[2.24,48.35]
Constant	0.12***
	[0.03,0.42]
LR Chi^2	28.79***
Pseudo R^2	0.18
AIC	142.33
AIC_C	143.10
w_i	0.72
n	116

Confidence intervals in parentheses
*p < 0.10 **p < 0.05 ***p < 0.01

D2.13. Top models for wanting “few” hippopotamuses (2009).

	Mod23 Odds Ratio	Mod12 Odds Ratio	Mod8 Odds Ratio	Mod15 Odds Ratio	Mod16 Odds Ratio
Don't want many of species					
Att. Katemwa Sch.	2.63**	2.73**	4.02**	6.43**	3.14**
	[1.05,6.60]	[1.08,6.90]	[1.34,12.07]	[1.42,29.05]	[1.10,8.94]
H.O.H. farmer		1.72	2.37*		
		[0.75,3.96]	[0.92,6.12]		
H.O.H. fisherman			3.10	0.24	1.66
			[0.67,14.27]	[0.01,3.93]	[0.44,6.30]
Std. 6				0.06*	
				[0.00,1.13]	
Std. 4 & 5				0.10	
				[0.00,2.19]	
Male				0.40*	
				[0.15,1.03]	
Son of a fisher				30.70**	
				[1.15,822.51]	
H.O.H. livestock keeper					
Son of a livestock keeper					
Son of a farmer					
Constant	0.43**	0.32**	0.18***	4.64	0.35**
	[0.20,0.94]	[0.13,0.80]	[0.05,0.62]	[0.29,73.58]	[0.13,0.92]
LR Chi^2	4.51**	6.17**	8.34**	14.35**	5.08*
Pseudo R^2	0.03	0.05	0.06	0.11	0.04
AIC	131.90	132.25	132.08	132.07	133.34
AIC_C	132.03	132.51	132.52	133.34	133.60
Δ AIC_C	0	0.47	0.49	1.31	1.57
w_i	0.28	0.22	0.22	0.15	0.13
n	96	96	96	96	96

D2.14. Top models for wanting “few” Egyptian geese (2009).

	Mod4 Odds Ratio	Null Odds Ratio
Don't want many of spp.		
Son of a fisher	0.00	
	[0.00,0.00]	
Constant	0.10***	0.09***
	[0.04,0.29]	[0.03,0.24]
LR Chi^2	1.26	0.00
Pseudo R^2	0.05	0.00
AIC	28.62	29.88
AIC_C	28.87	29.96
Δ AIC_C	0	1.09
w_i	0.36	0.21
n	50	50

Confidence intervals in parentheses
*p < 0.10 **p < 0.05 ***p < 0.01

D2.15. Top models for wanting “few” elephants (2009).

	Mod40b Odds Ratio	Mod26b Odds Ratio	Mod21b Odds Ratio	Mod23b Odds Ratio	Mod32b Odds Ratio	Mod5b Odds Ratio
Don't want many of spp.						
Std. 4 & 5	0.11**	0.11**	0.11**	0.11**	0.12**	0.18*
	[0.01,0.90]	[0.01,0.87]	[0.01,0.89]	[0.01,0.87]	[0.01,0.93]	[0.01,1.07]
Std. 7	0.74	0.72	0.66	0.71	0.70	0.70
	[0.06,8.40]	[0.06,8.14]	[0.06,7.75]	[0.06,8.07]	[0.06,8.15]	[0.05,9.20]
Son of a livestock keeper		0.00				
		[0.00,.]				
Male			0.51*		0.51*	0.52*
			[0.23,1.11]		[0.24,1.12]	[0.24,1.12]
H.O.H. livestock keeper			0.34	0.36		
			[0.04,3.22]	[0.04,3.28]		
Att. Katemwa Sch.						1.02
						[0.39,2.65]
H.O.H. farmer					0.97	
					[0.45,2.07]	
Constant	0.68**	0.70*	0.93	0.71*	0.90	0.87
	[0.46,0.99]	[0.48,1.03]	[0.56,1.53]	[0.48,1.04]	[0.48,1.68]	[0.35,2.18]
LR Chi^2	7.32**	9.42**	11.26**	8.31**	10.23**	10.22**
Pseudo R^2	0.04	0.06	0.07	0.05	0.06	0.06
AIC	164.06	163.97	164.12	165.07	165.16	165.16
AIC$_C$	164.26	164.30	164.62	165.40	165.66	165.66
Δ AIC$_C$	0	0.04	0.37	1.15	1.40	1.41
w_i	0.23	0.22	0.19	0.13	0.11	0.11
n	126	126	126	126	126	126

Confidence intervals in parentheses
*p < 0.10 **p < 0.05 ***p < 0.01

D2.16. Top models for wanting "few" giraffes (2009).

	Mod3 Odds Ratio	Mod2† Odds Ratio
Don't want many of spp.		
Std. 7	0.00	
	[0.00,0.00]	
Std. 4 & 5	0.00	
	[0.00,0.00]	
Att. Katemwa Sch.		2.31
		[0.73,7.34]
Constant	0.30***	
	[0.19,0.47]	
LR Chi^2	6.76	2.27
Pseudo R^2	0.06	0.02
AIC	114.88	121.38
AIC_C	115.10	121.48
Δ AIC_C	0	6.39
w_i	0.89	0.03
n	119	119

Confidence intervals in parentheses

*$p < 0.10$ **$p < 0.05$ ***$p < 0.01$

† Shown although not within 2 AIC_C units of the model with the lowest score because of violations in the aforementioned model.

APPENDIX E

ADULT INTERVIEW PROTOCOL

Protocol used during interviews with adults in communities surrounding Rubondo Island National Park, Tanzania, during 2008.

Community Member Interview Protocol

Before asking any of the questions below, give the potential participant a copy of the information sheet and ask him or her to read it. When the participant indicates having read the form, summarize the details contained within verbally and ask the participant if s/he is willing to participate in the study. Give the individual time to consider if he/she is willing to participate. If his/her answer is yes, continue.

Please ask these questions in order so that you do not influence the participant's responses. However, please also explore in more detail any new themes or ideas that are brought up during the interview. If you use a prompt, record the resulting response in the space below the prompt.

1. Participant's gender: ☐Male ☐Female

2. What is your age? _________

3. What is the name of your village? ____

4. What is your profession (for women who do not work outside the home, ask for husband's/father's profession and note below, indicating whose profession is recorded)?

☐Farmer ☐Businessman ☐Livestock keeper

☐Fisherman ☐Traditional healer ☐Other _______________

5. What is the name of your family's tribe?___________________________________

6. What kinds of animals do you like best?

Prompt if participant is unsure about what is being asked: For example, someone might like brown animals the best.

7. Do you think wildlife is important if it cannot be used for food or other purposes?

☐Yes ☐No ☐Not sure

If yes, why?

1

8. Is it important to you that wildlife has a place to live?

☐Yes ☐No ☐Not sure

9. What makes you proud about where you live?

10. What do you think about Rubondo Island National Park?

Prompt: Have you ever visited Rubondo?

Prompt: Would you like to visit Rubondo?

Prompt: Would you like your children to be able to visit Rubondo?

Prompt: Do you know anyone that has been to Rubondo?

11. Did any of your relatives or ancestors ever live on Rubondo Island?

☐Yes ☐No ☐Not sure

If yes: Which relatives/ancestors?

Did they or do they talk about Rubondo to you? (If yes, ask about nature of discussions.)

12. What is your favorite wild animal?

Why?

13. What other wild animals do you like?

Why?

(Lay out sketches of the following animals on a flat surface: fish eagle, large-spotted genet, monitor lizard, spotted-necked otter, sitatunga, dagaa, vervet monkey, hippo, crocodile, little egret, and Egyptian goose. Ask the participant to take a few minutes to look over the sketches. When you ask questions that involve categorizing animals, lay out the corresponding paper (e.g., "animals that I know") and ask participants to physically move the appropriate animals onto the paper.)

14. a) Which of these animals have you seen or heard about? (Prompt: Which of these animals do you know?)

☐fish eagle ☐large-spotted genet ☐monitor lizard
☐spotted-necked otter ☐sitatunga ☐dagaa
☐vervet monkey ☐hippo ☐crocodile
☐little egret ☐Egyptian goose

b) Which of these animals live near your village or sometimes come to your village?

☐fish eagle ☐large-spotted genet ☐monitor lizard
☐spotted-necked otter ☐sitatunga ☐dagaa
☐vervet monkey ☐hippo ☐crocodile
☐little egret ☐Egyptian goose

c) Which of these animals do you think are attractive?

☐fish eagle ☐large-spotted genet ☐monitor lizard
☐spotted-necked otter ☐sitatunga ☐dagaa
☐vervet monkey ☐hippo ☐crocodile
☐little egret ☐Egyptian goose

d) Which of these animals do you think are useful?

☐ fish eagle
☐ spotted-necked otter
☐ vervet monkey
☐ little egret
☐ large-spotted genet
☐ sitatunga
☐ hippo
☐ Egyptian goose
☐ monitor lizard
☐ dagaa
☐ crocodile

If the participant thinks the otter is useful, show picture again and ask: how is this animal useful?

e) Which of these animals do you like? *For each animal that the individual likes*: What about this animal do you like?

☐ fish eagle ______
☐ large-spotted genet ______
☐ monitor lizard ______
☐ spotted-necked otter ______
☐ sitatunga ______
☐ dagaa ______
☐ vervet monkey ______
☐ hippo ______
☐ crocodile ______
☐ little egret ______
☐ Egyptian goose ______

4

f) Which of these animals do you not like? *For each animal that the individual dislikes*: What about this animal do you not like?

☐ fish eagle ☐ large-spotted genet ☐ monitor lizard

☐ spotted-necked otter ☐ sitatunga ☐ dagaa

☐ vervet monkey ☐ hippo ☐ crocodile

☐ little egret ☐ Egyptian goose

g) If you had to pick one of these animals that you like the most, which would it be?

Why?

h) If you had to pick one of these animals that you like the least, which would it be?

Why?

i) Which of these animals would you like there to be more of?

- ☐ fish eagle
- ☐ spotted-necked otter
- ☐ vervet monkey
- ☐ little egret
- ☐ large-spotted genet
- ☐ sitatunga
- ☐ hippo
- ☐ Egyptian goose
- ☐ monitor lizard
- ☐ dagaa
- ☐ crocodile

j) Which of these animals would you like there to be less of?

- ☐ fish eagle
- ☐ spotted-necked otter
- ☐ vervet monkey
- ☐ little egret
- ☐ large-spotted genet
- ☐ sitatunga
- ☐ hippo
- ☐ Egyptian goose
- ☐ monitor lizard
- ☐ dagaa
- ☐ crocodile

Lay out stacks of the following word cards (at least 11 of each): wild plants, plants that people grow, wild animals, animals that belong to people, fish, other, not sure.

k) Please put the card that represents what each animal eats next to the picture of that animal. Remember that each animal can eat more than 1 type of food.

fish eagle	large-spotted genet	monitor lizard
______	______	______
______	______	______
spotted-necked otter	sitatunga	dagaa
______	______	______
______	______	______
vervet monkey	hippo	crocodile
______	______	______
______	______	______
little egret	Egyptian goose	
______	______	
______	______	

6

15. What do you think about protecting wildlife and the places they live?

Prompt: Is it important to you? Why or why not?

Prompt: Does it benefit or harm you?

16. What do you think about wildlife tourism? *(Define wildlife tourism for each participant to be sure definitions are comparable. Define as: people going to a place to see wildlife.)*

Prompt: Do you think wildlife tourism is important in Tanzania?

Prompt: Do you think wildlife tourism is important in or near your community?

Prompt: How does wildlife tourism affect you?

17. What do you think about wildlife tourism on Rubondo?

Prompt: How does wildlife tourism on Rubondo benefit you?

Prompt: How does wildlife tourism on Rubondo harm you?

Prompt: How would increased tourism on Rubondo affect you?

Prompt: Would you like for there to be more wildlife tourism on Rubondo?

18. What do you think are the most important natural resources here **in your community**? *(Define natural resources for all participants. Define as: Natural resources are things that are supplied by nature. They are made naturally by the earth or its processes. Gold is a natural resource. So is petroleum and plants like coconuts.)*

Show the participant the sketch of the otter.
19. What do you think of when you see this animal?

20. How often would you say you see this animal?

21. How do you feel when you see this animal?

22. What do you do when you see this animal?

23. What would you like to do when you see this animal?

24. What are some other ways that people in your community react when they see this animal?

25. What are some things you think are important for people who are working with wildlife in National Parks in Tanzania to understand about you or how wildlife affects you?

26. Is there anything else you would like to share with me about anything we talked about?

27. What about more general things like wildlife, the environment, or what it is like to live near a National Park like Rubondo?

28. Many people come to Tanzania—and some to Rubondo, which is very close to you—to study wildlife. Do you know much about what these people do and learn?

29. Would you like to know more about what they do and learn?

APPENDIX F

TOURIST SURVEY INSTRUMENT

Survey instrument used to assess the interests of travelers at Tanzania's Kilimanjaro International Airport during 2009.

Wildlife Viewing Survey

Thank you for participating in this survey about the wildlife viewing interest and opinions of travelers in Tanzania. This research is being conducted by Sadie Stevens, a PhD student at the University of Massachusetts, USA, and has been approved by the University's Institutional Review Board. If you have any questions about this survey please contact Sadie Stevens at (+1) 240-446-5129 or sstevens@nrc.umass.edu.

About Your Wildlife Viewing Preferences

1. Please answer the following questions using the table below.

	A. How knowledgeable do you consider yourself about each of the animals listed below? (Please check the appropriate box.)			B. Please place a check mark in the appropriate box below if you had seen the animals listed on the left **before participating in this survey** (in the wild, in captivity, in photos, on television, etc.).
	Not at all	Somewhat	Very	
A. Chimpanzee	☐	☐	☐	☐
B. Crocodile	☐	☐	☐	☐
C. Elephant	☐	☐	☐	☐
D. Fish Eagle	☐	☐	☐	☐
E. Hippopotamus	☐	☐	☐	☐
F. Sitatunga	☐	☐	☐	☐
G. Spotted-necked otter	☐	☐	☐	☐

2. Please use the table below to rate how interested you would be in seeing the following animals on safari. A separate photo sheet is provided with an image of each animal to help you. Please also place a check mark in the column on the far right if you had not heard of the animal before participating in this survey.

	Very Uninterested	Uninterested	Neutral	Interested	Very interested	Not sure	I have not heard of this animal
1. Buffalo	☐	☐	☐	☐	☐	☐	☐
2. Bushbuck	☐	☐	☐	☐	☐	☐	☐
3. Chimpanzee	☐	☐	☐	☐	☐	☐	☐
4. Crocodile	☐	☐	☐	☐	☐	☐	☐
5. Elephant	☐	☐	☐	☐	☐	☐	☐
6. Fish eagle	☐	☐	☐	☐	☐	☐	☐
7. Genet	☐	☐	☐	☐	☐	☐	☐
8. Giraffe	☐	☐	☐	☐	☐	☐	☐
9. Goliath heron	☐	☐	☐	☐	☐	☐	☐
10. Hippopotamus	☐	☐	☐	☐	☐	☐	☐
11. Jackal	☐	☐	☐	☐	☐	☐	☐
12. Leopard	☐	☐	☐	☐	☐	☐	☐
13. Lion	☐	☐	☐	☐	☐	☐	☐
14. Mongoose	☐	☐	☐	☐	☐	☐	☐
15. Monitor Lizard	☐	☐	☐	☐	☐	☐	☐
16. Rhinoceros	☐	☐	☐	☐	☐	☐	☐
17. Serval	☐	☐	☐	☐	☐	☐	☐
18. Sitatunga	☐	☐	☐	☐	☐	☐	☐
19. Spotted-necked otter	☐	☐	☐	☐	☐	☐	☐
20. Vervet monkey	☐	☐	☐	☐	☐	☐	☐

Please turn over.

3. Please rank the following animals from 1 to 7, giving a **1** to the animal you would be **most interested** in viewing and a **7** to the animal you would be **least interested** in viewing. Please see the box below for an example.

_____Chimpanzee
_____Crocodile
_____Elephant
_____Fish eagle
_____Giraffe
_____Sitatunga
_____Spotted-necked otter

Example:	
2	Pineapple
3	Orange
4	Mango
7	Lemon
1	Watermelon
5	Papaya
6	Apple

About Rubondo Island National Park

Please answer the questions below by placing a check mark in the appropriate box.	**Yes**	**No**	**Not sure**
1. Had you heard of Rubondo Island National Park **before participating in this survey?** (If no, please skip to the "About You" section.)	☐	☐	☐
2. Have you been to Rubondo Island National Park?	☐	☐	☐
3. Do you have plans to go to Rubondo Island National Park within the next month?	☐	☐	☐

About You

1. Age:	2. Gender:	3. Country of Residence:	4. Highest level of education:
	☐Female ☐Male		☐Primary (Elementary) School ☐Secondary (High) School ☐Bachelor's Degree ☐Graduate Degree

Please answer the questions below by placing a check mark in the appropriate box.	Yes	No	Not sure/ Not applicable
5. Are you traveling with children on this trip?	☐	☐	☐
6. Are you traveling with a tour company on this trip?	☐	☐	☐
7. Are you retired?	☐	☐	☐
8. *Including this trip,* have you ever gone on vacation with *the primary purpose* of viewing wildlife?	☐	☐	☐
9. *If you are* ***not a resident of Africa***, had you been to the continent before this trip?	☐	☐	☐

10. If you are a ***first time visitor*** to Africa, how many days have you been on the continent? ________

11. When choosing a vacation destination, what factors are important in your choice?

12. What is the purpose of your travel today?

☐Business ☐Pleasure ☐Volunteering ☐Other (Please indicate_______________________)

13. *In general,* how important are opportunities to view wildlife in the planning of your vacations?

☐ Very unimportant ☐ Unimportant ☐ Neither Important or Unimportant ☐ Important ☐ Very Important ☐ Not sure

14. How knowledgeable about wildlife do you consider yourself?

☐ Not knowledgeable ☐ Somewhat knowledgeable ☐ Very knowledgeable ☐Not sure

Thank you. I appreciate your feedback!

Animal Key


1. Buffalo


2. Bushbuck


3. Chimpanzee


4. Crocodile


5. Elephant


6. Fish eagle


7. Genet


8. Giraffe


9. Goliath heron


10. Hippo

Animal Key


11. Jackal


12. Leopard


13. Lion


14. Mongoose


15. Monitor Lizard


16. Rhinoceros


17. Serval


18. Sitatunga


19. Spotted-necked otter


20. Vervet monkey

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